

Figure 1

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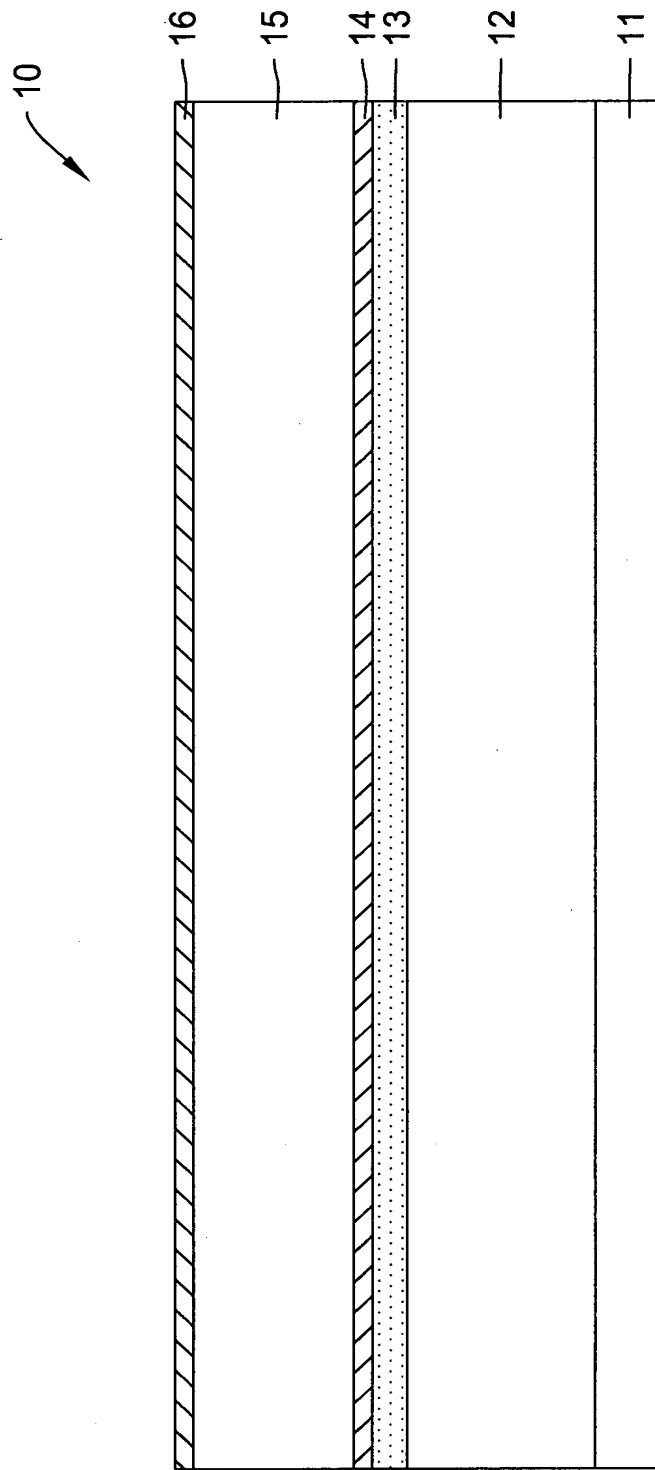


Figure 2

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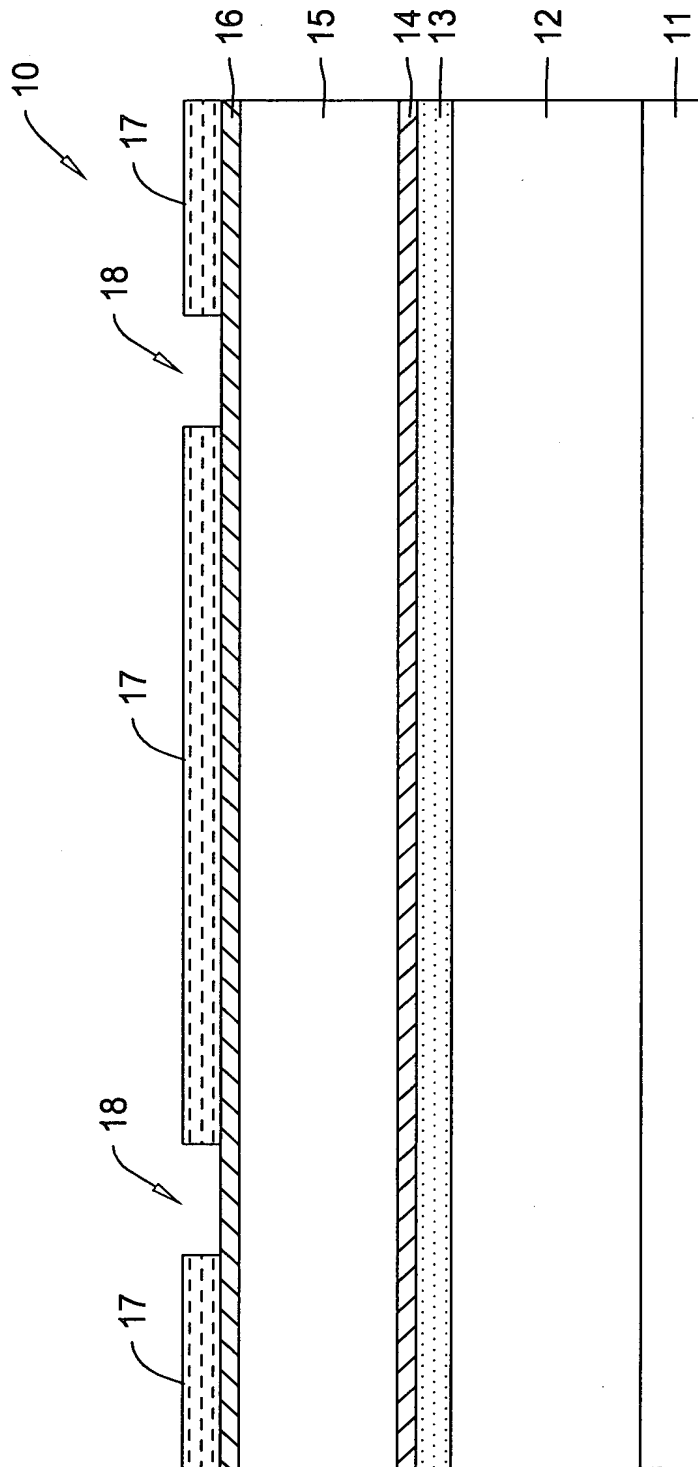


Figure 2A

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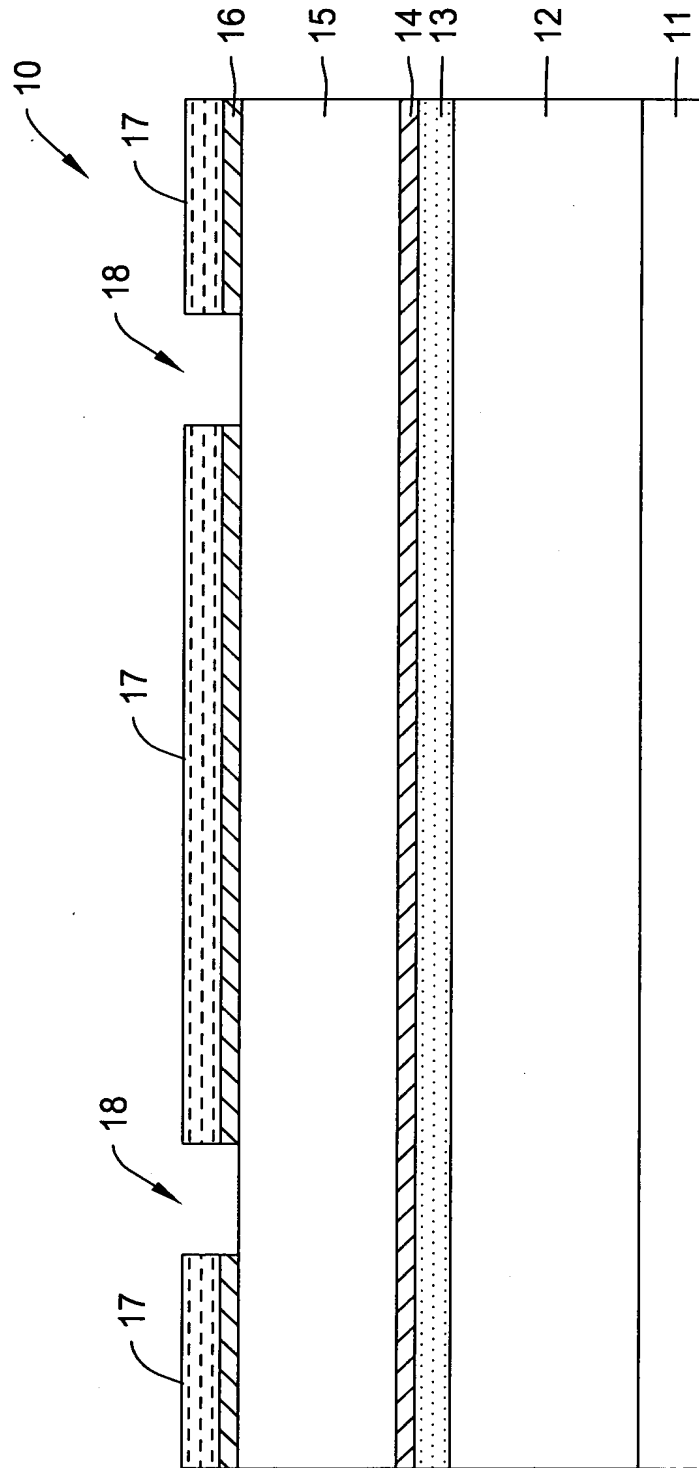


Figure 3

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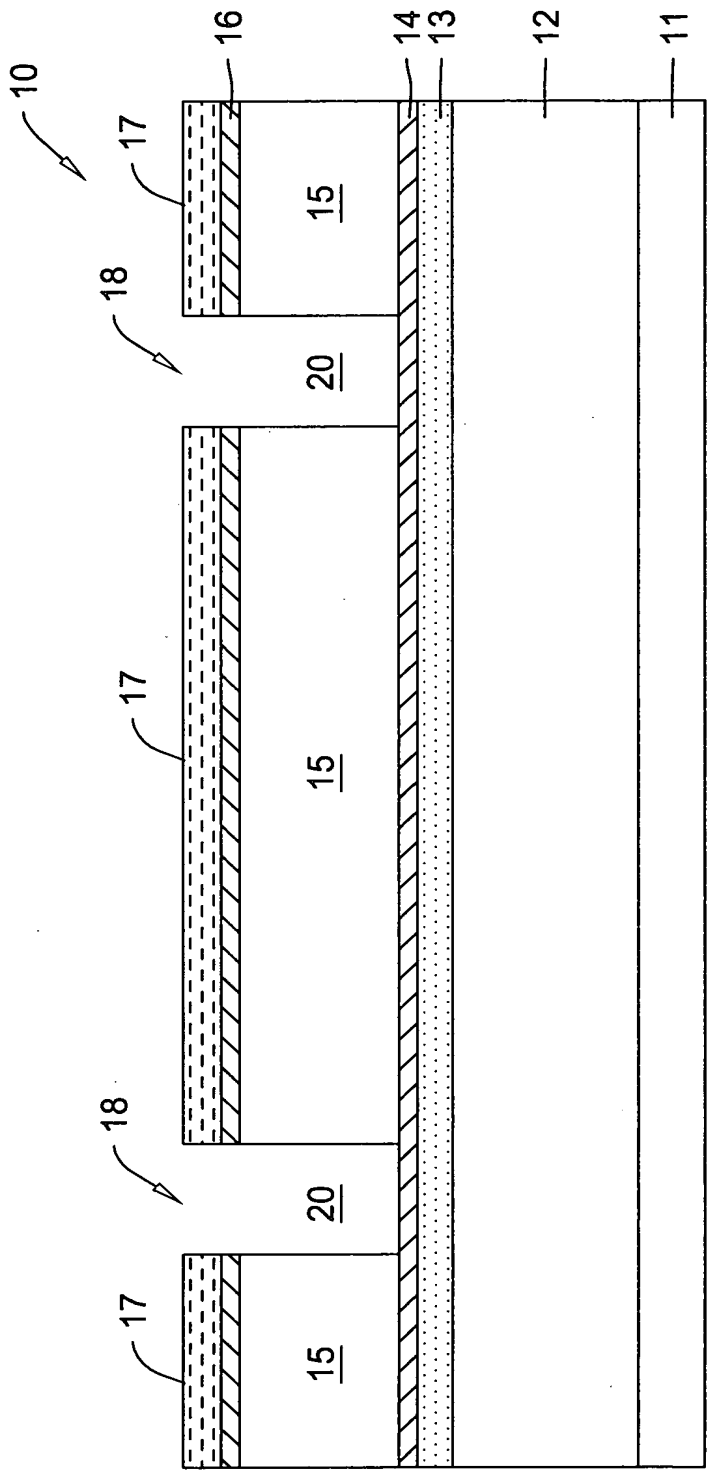


Figure 4

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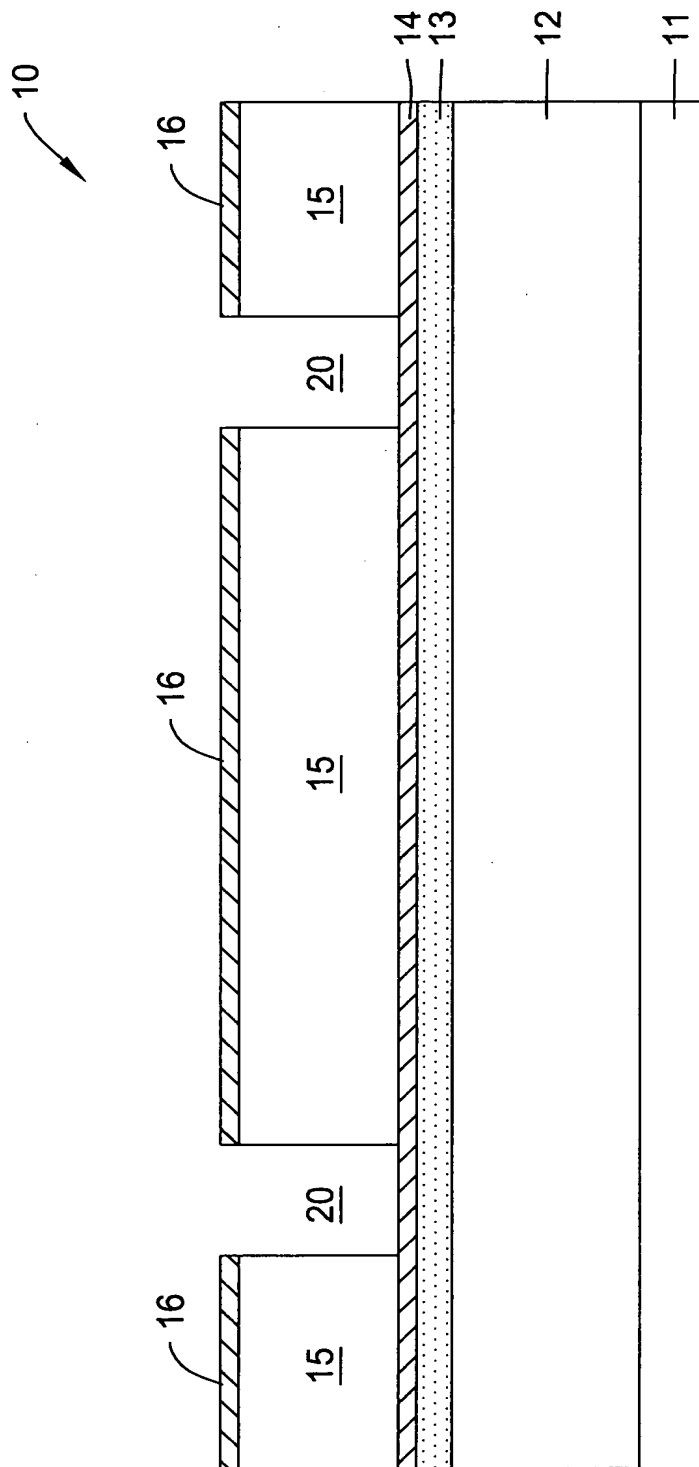


Figure 5

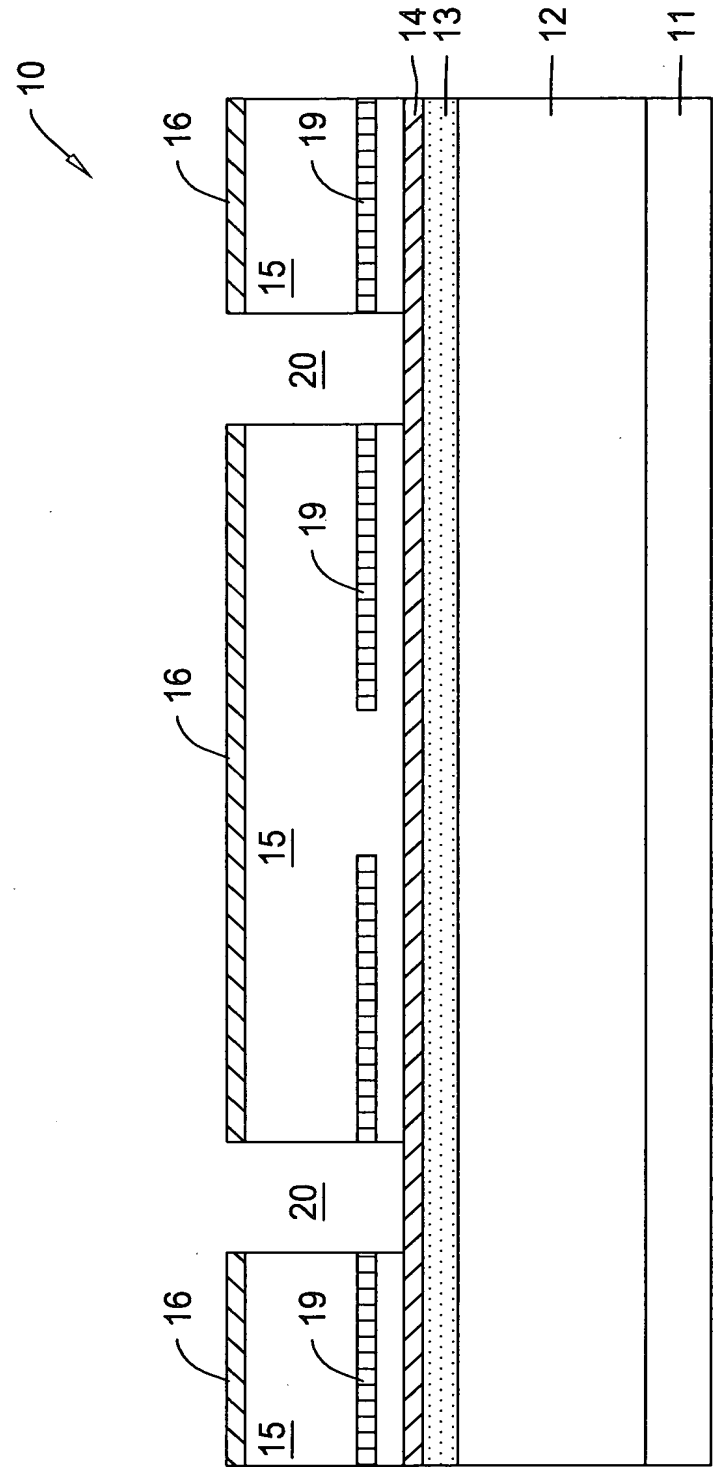


Figure 6

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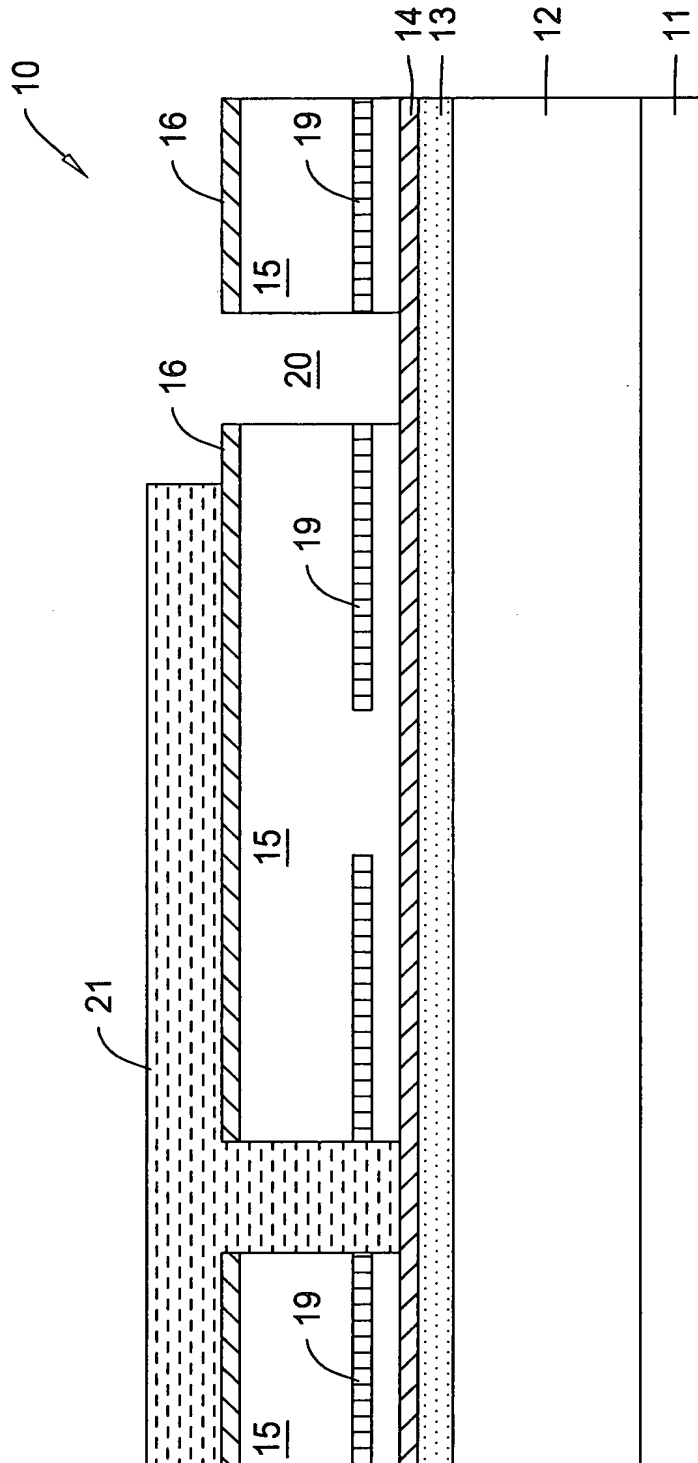


Figure 7

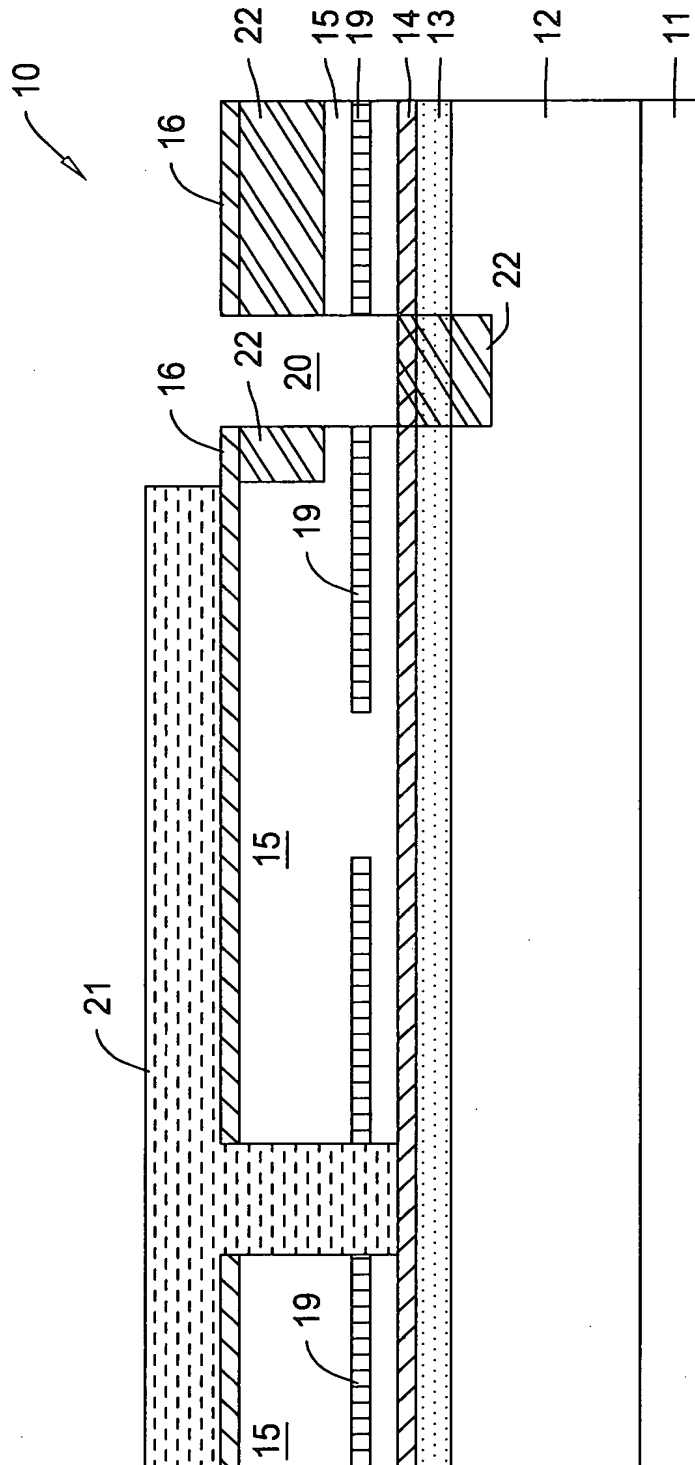


Figure 8

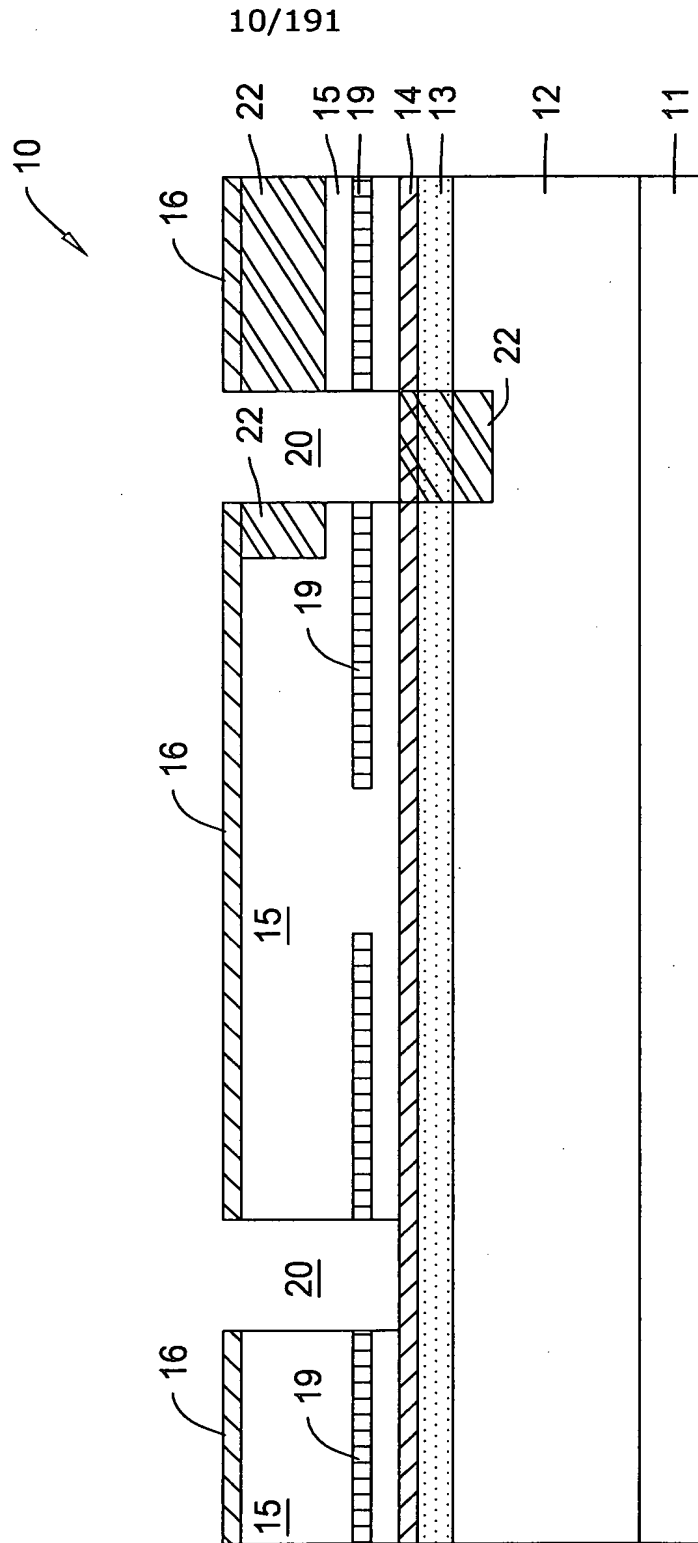


Figure 9



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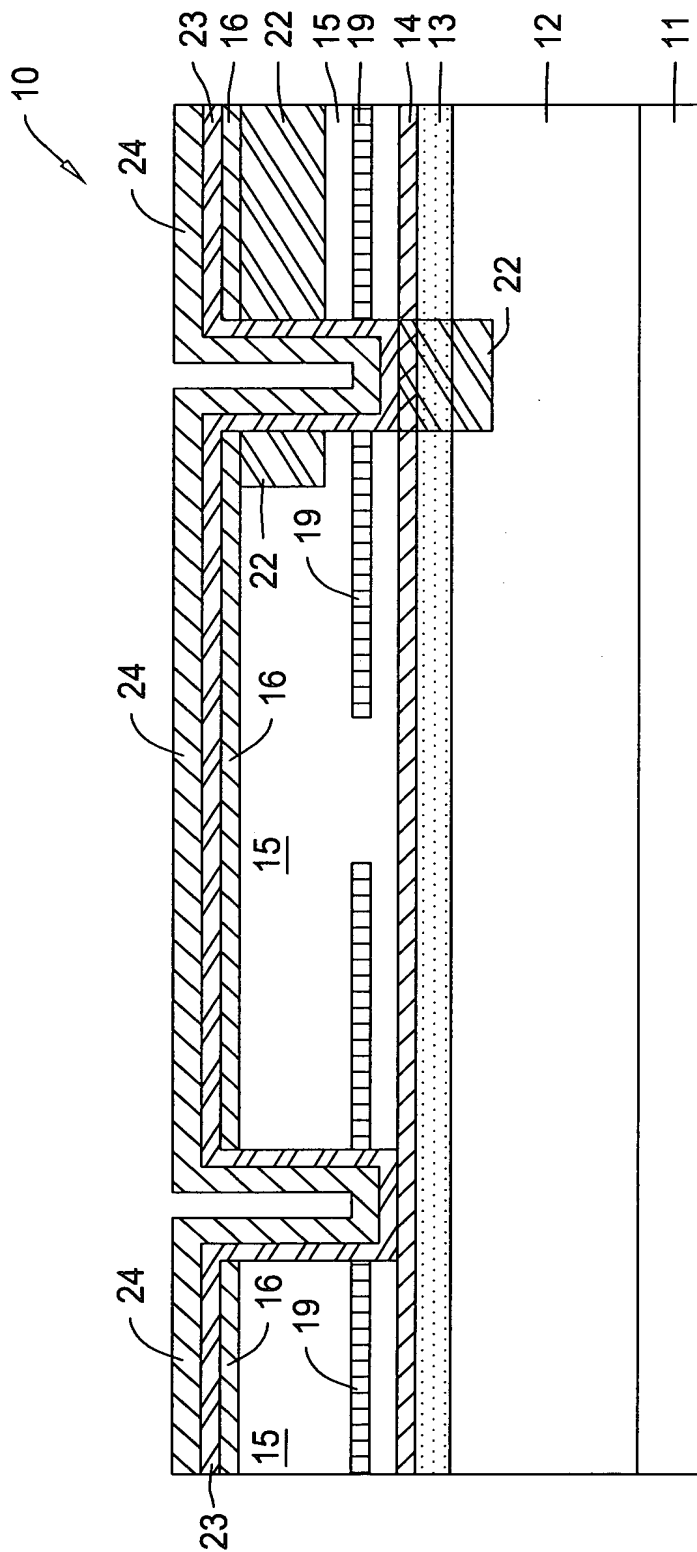


Figure 11

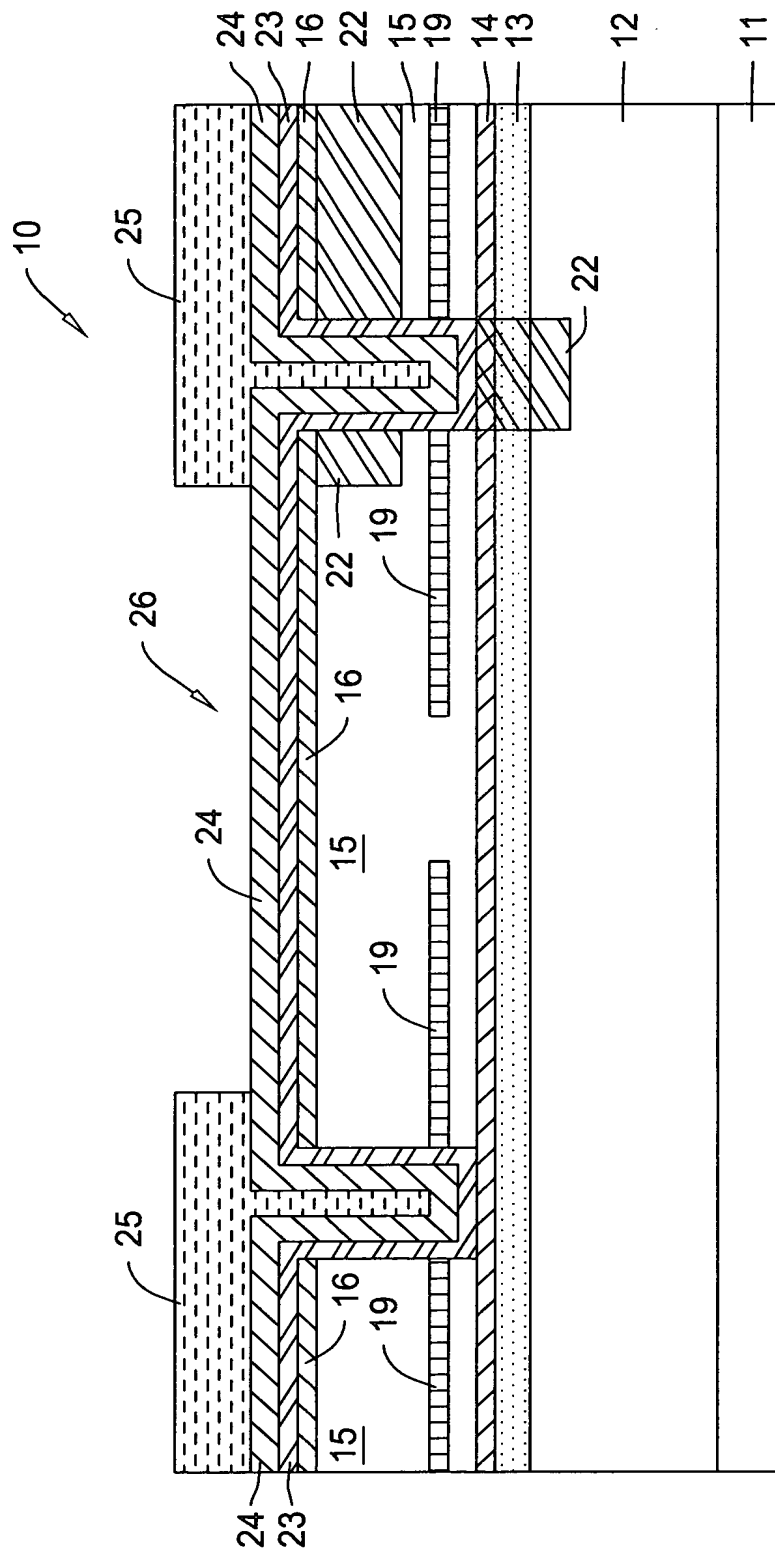


Figure 12

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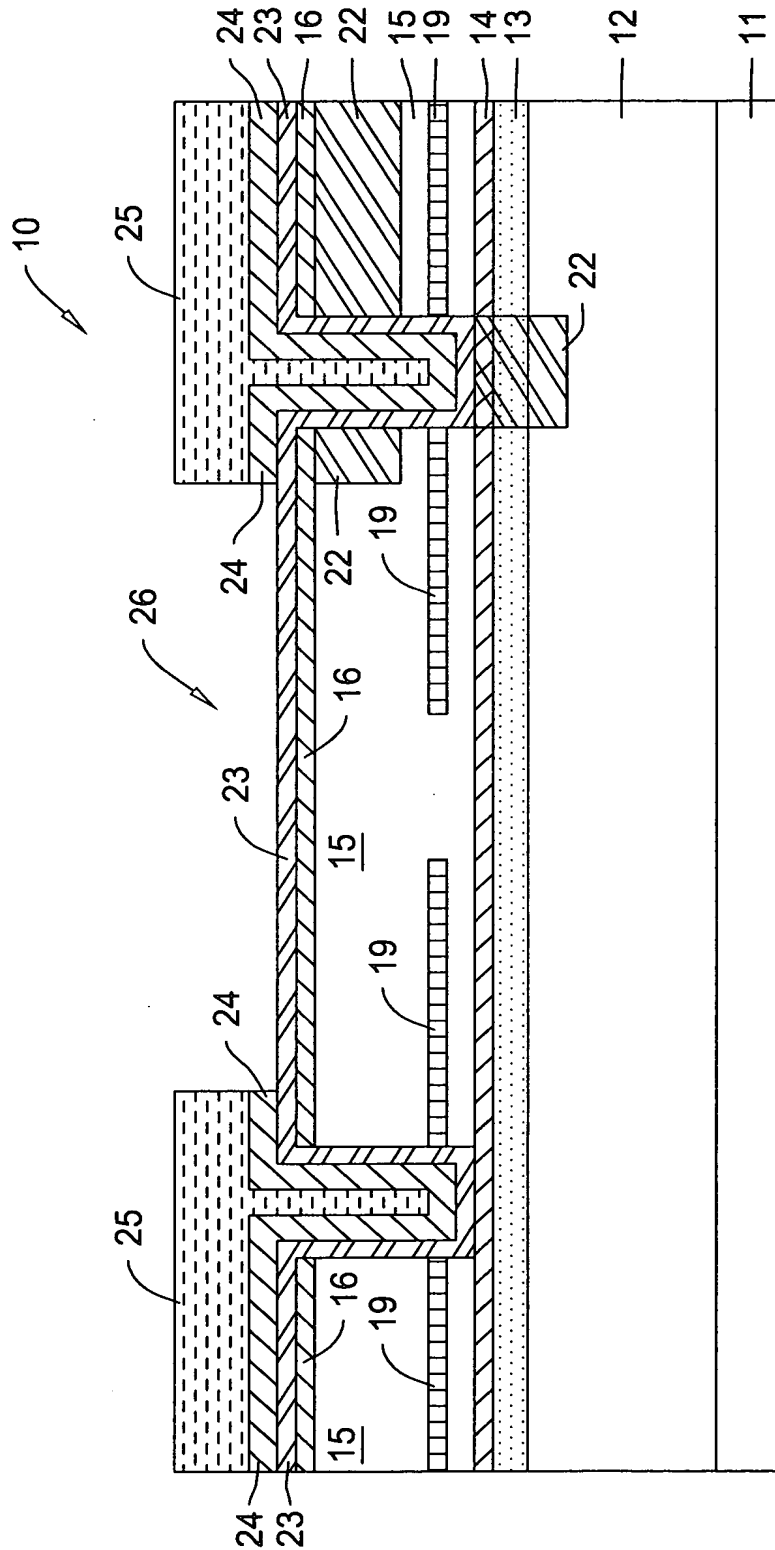


Figure 13



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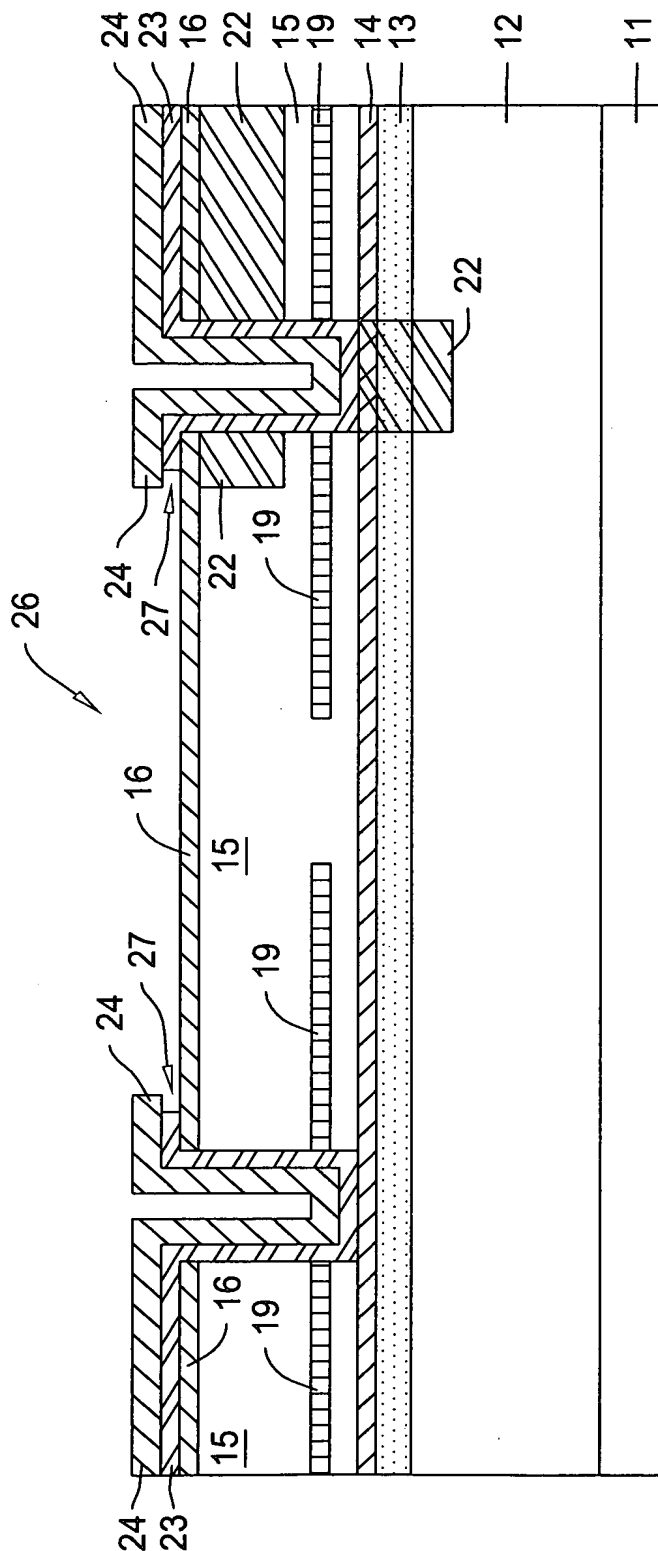


Figure 15

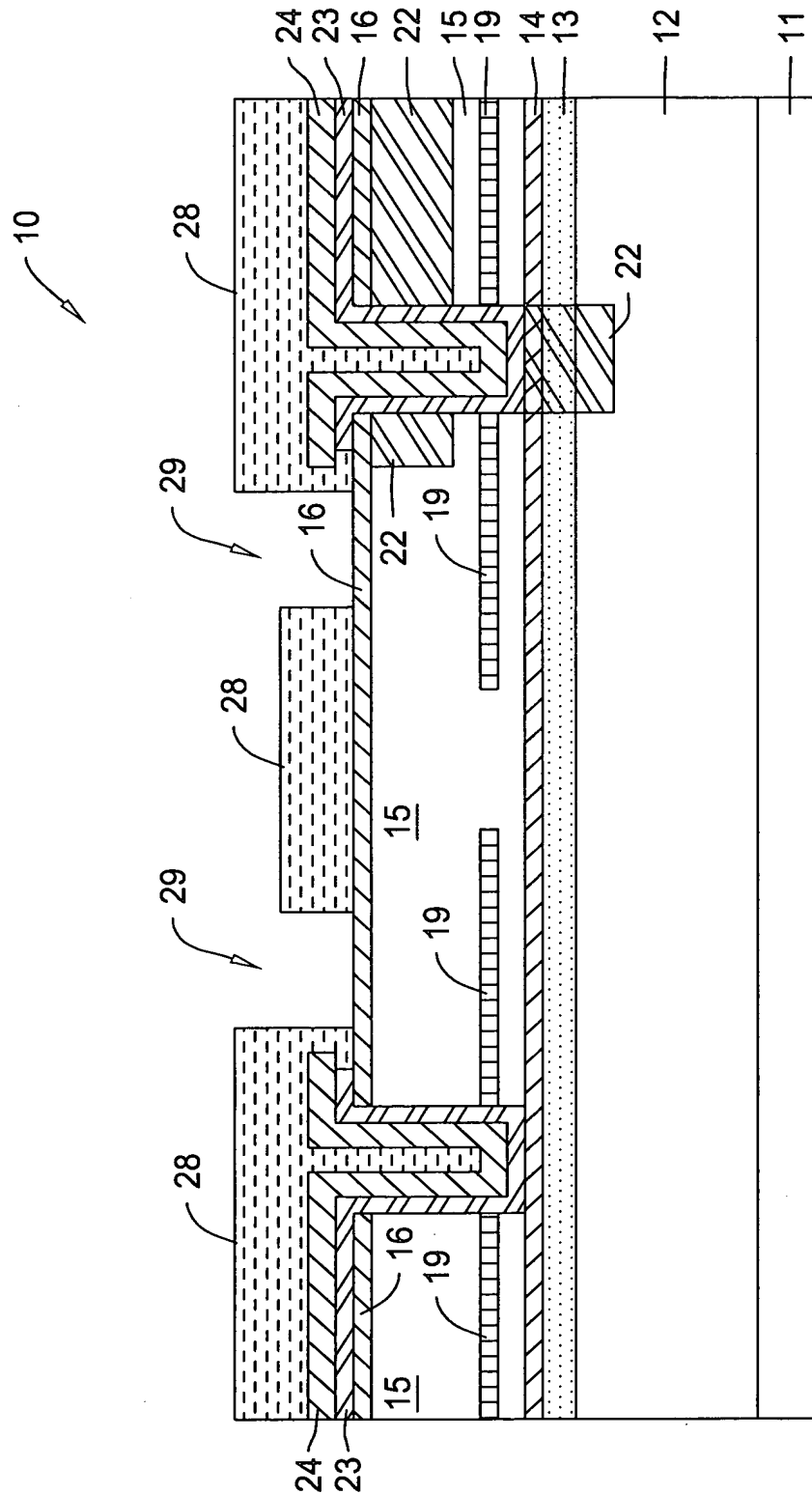


Figure 16

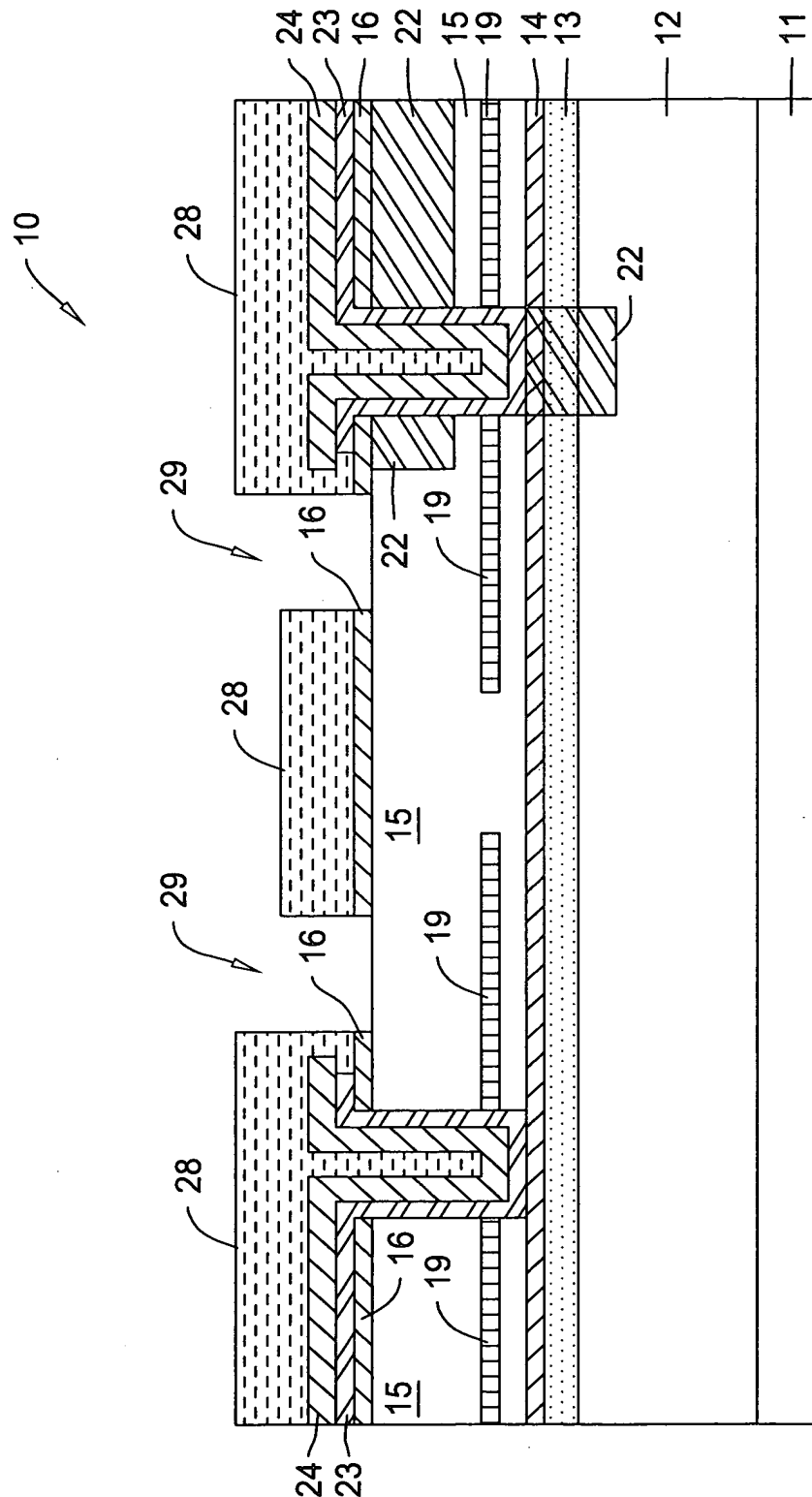


Figure 17

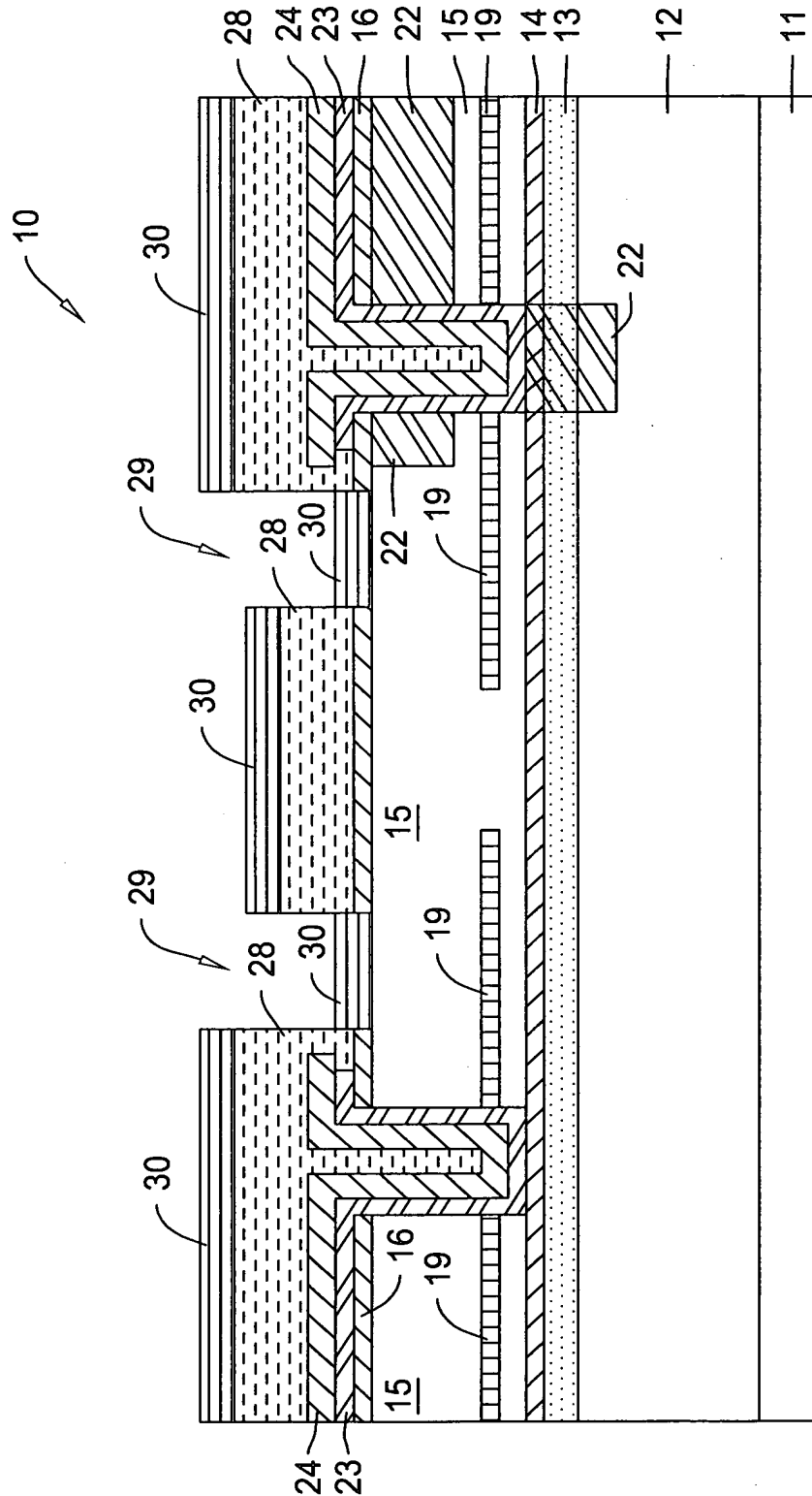


Figure 18

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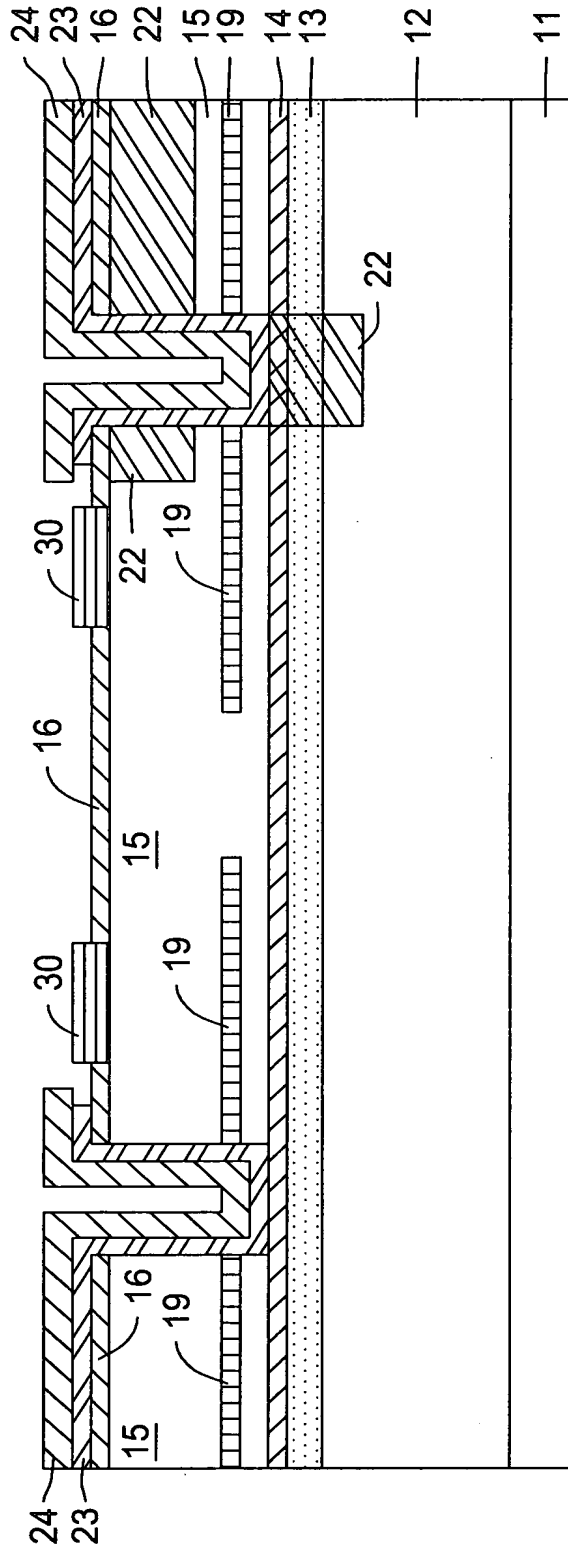


Figure 19

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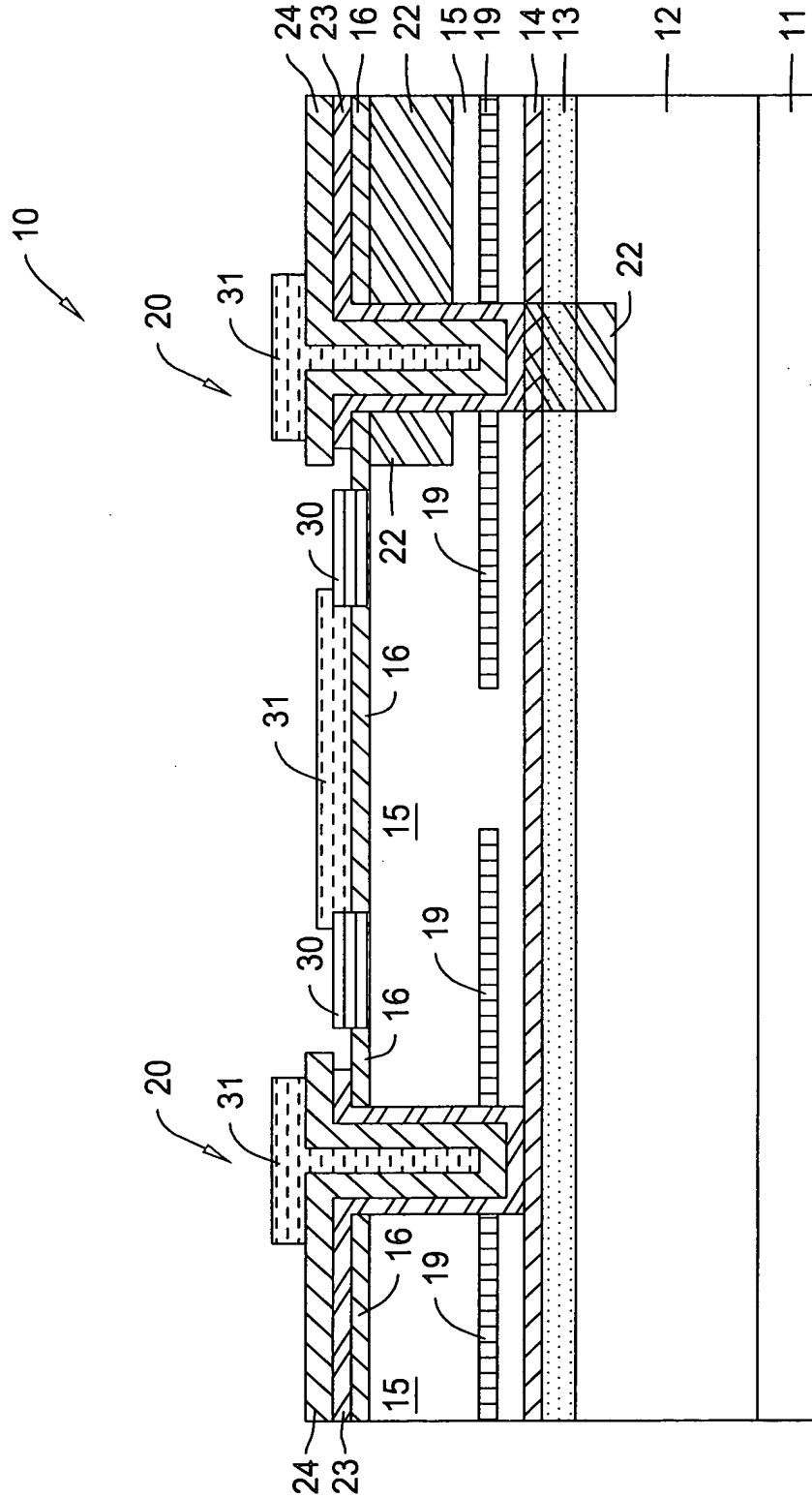


Figure 20

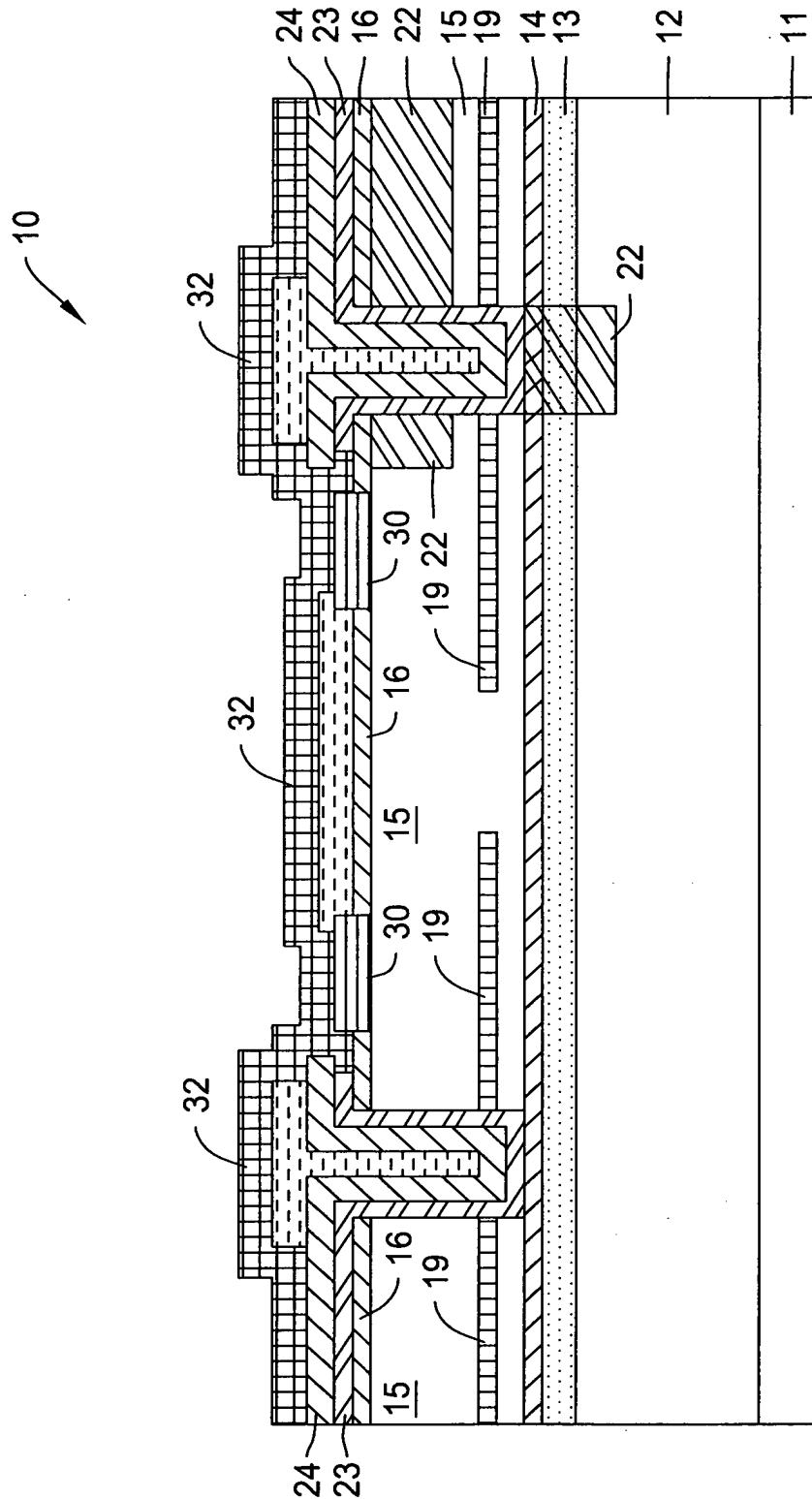


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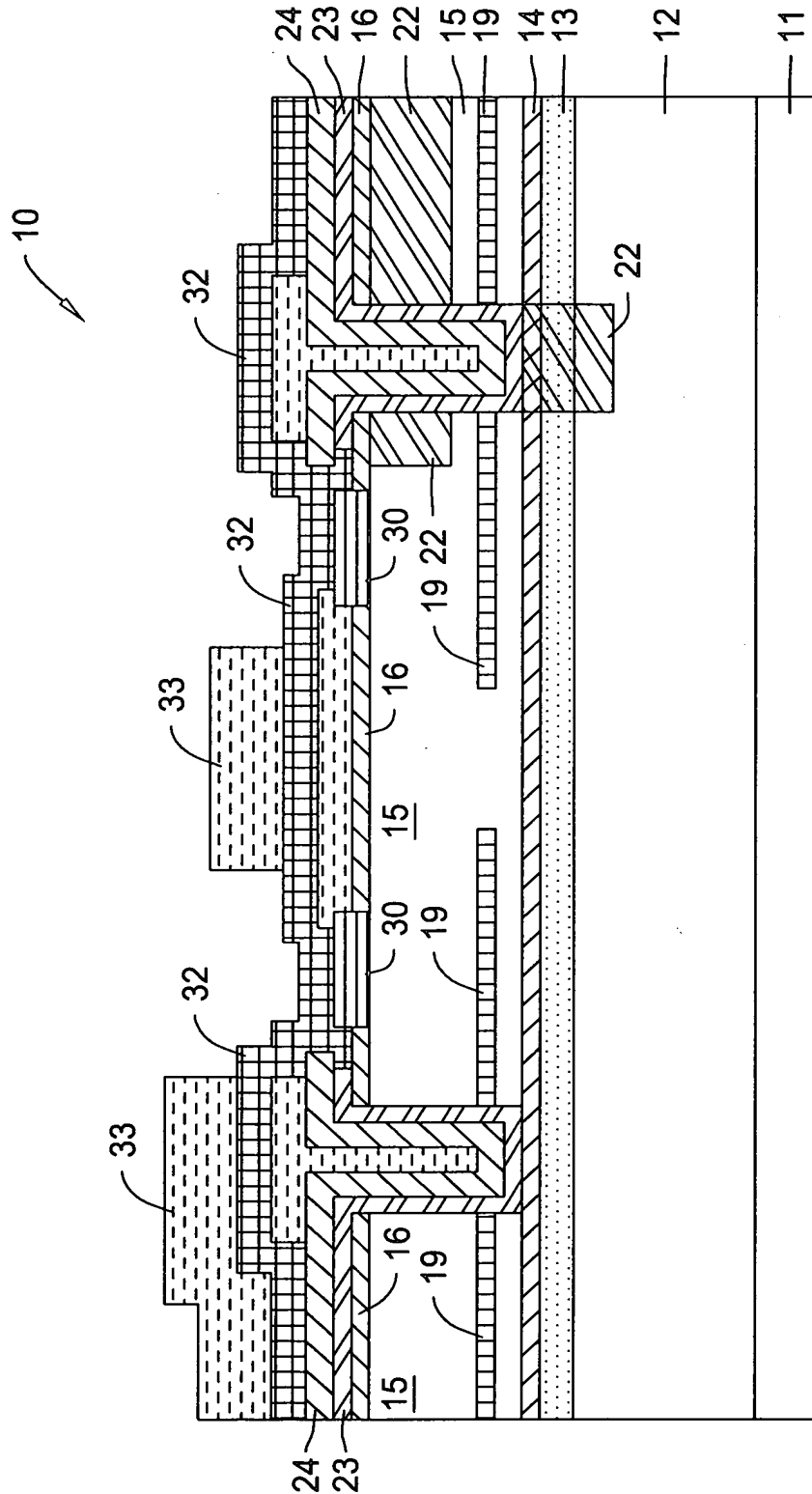


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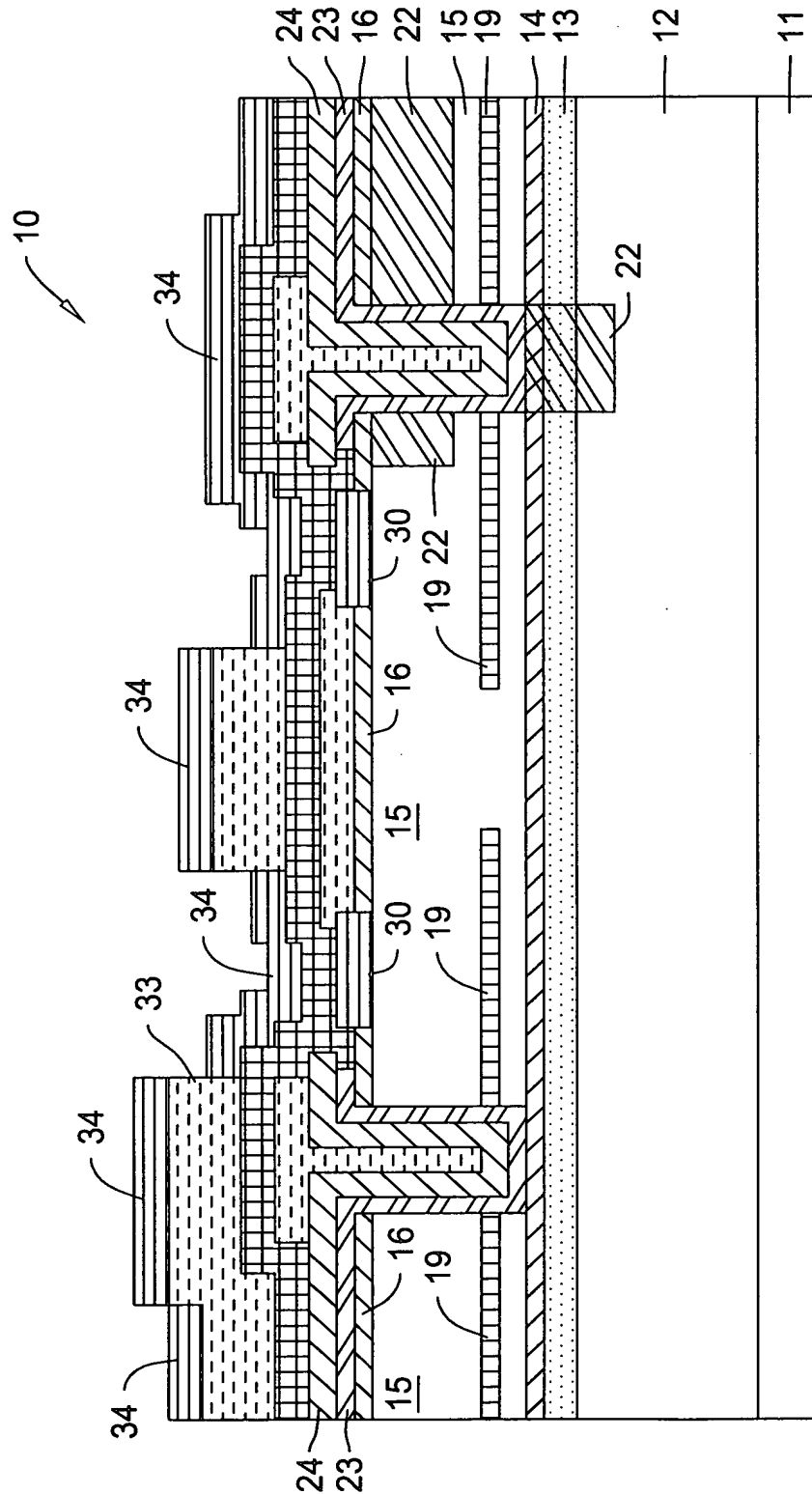


Figure 23

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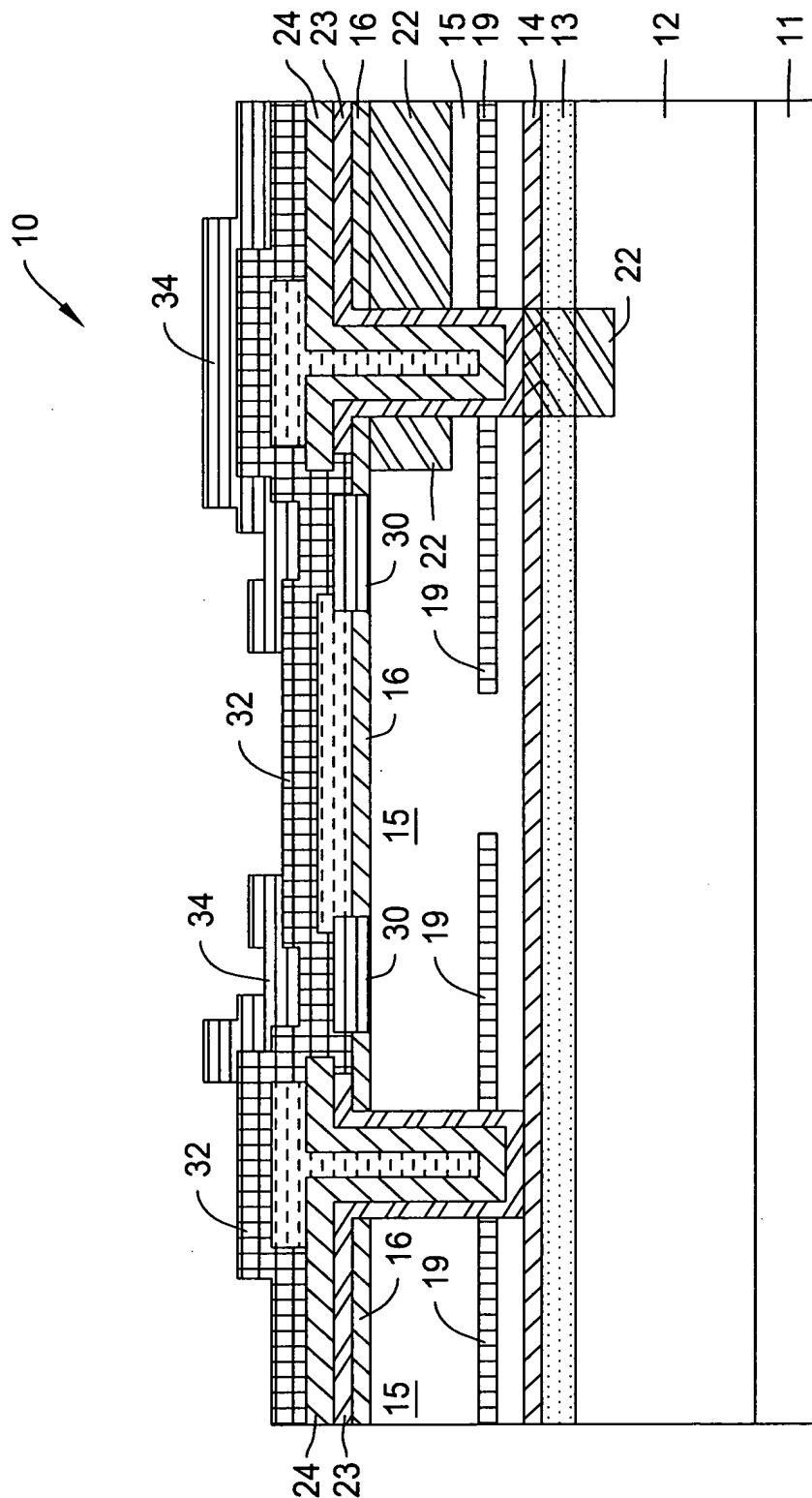


Figure 24

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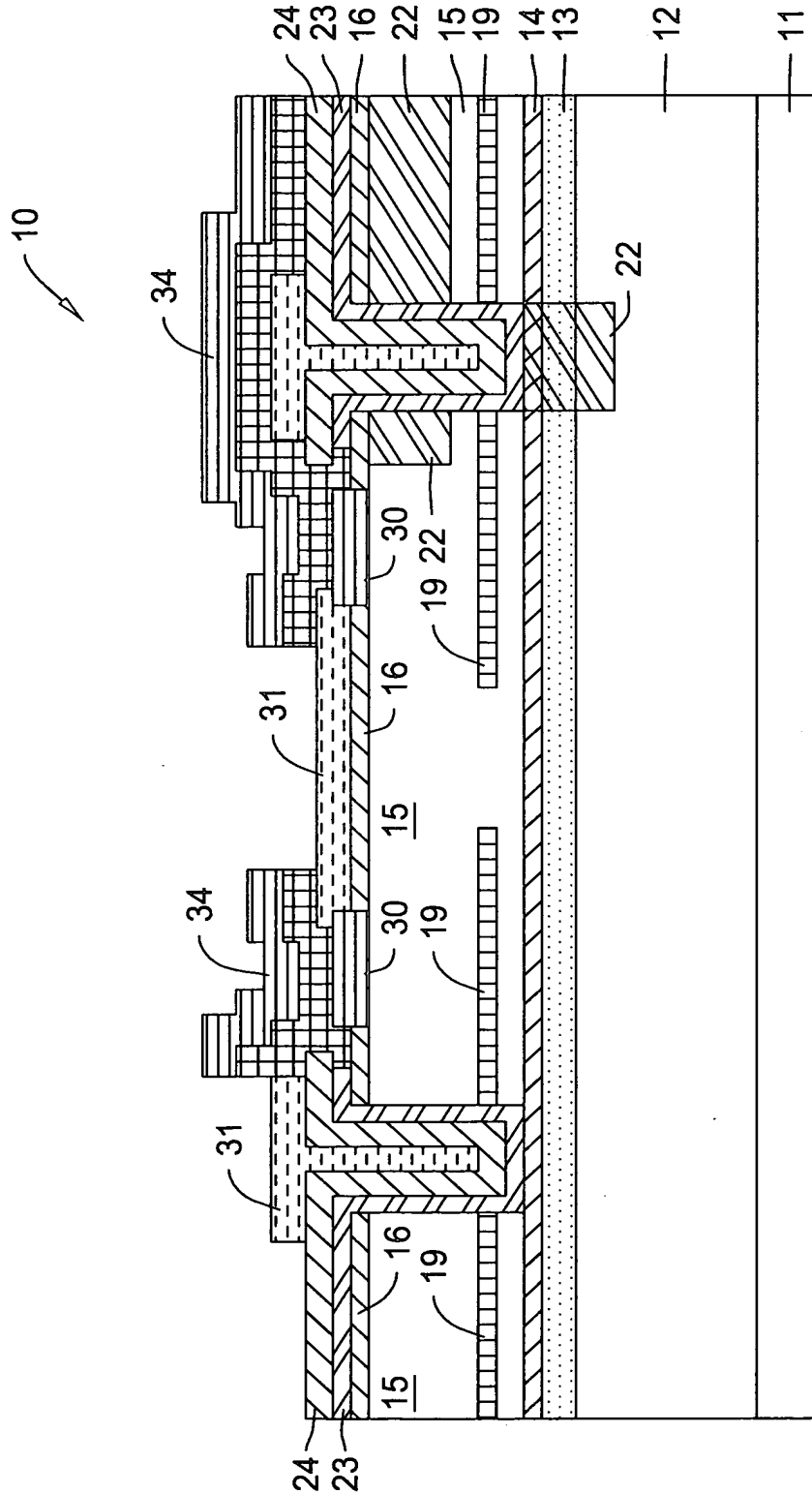


Figure 25

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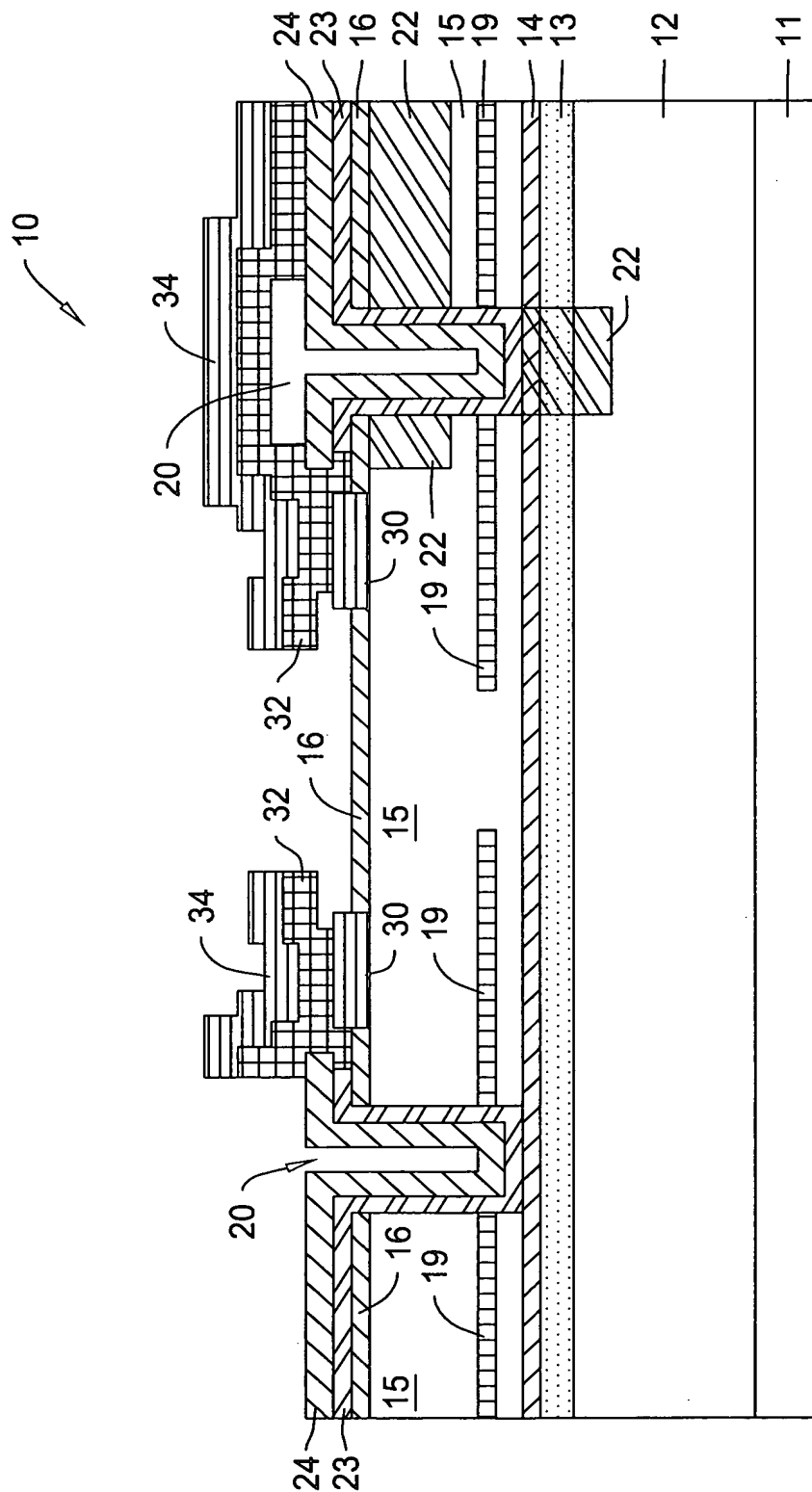


Figure 26

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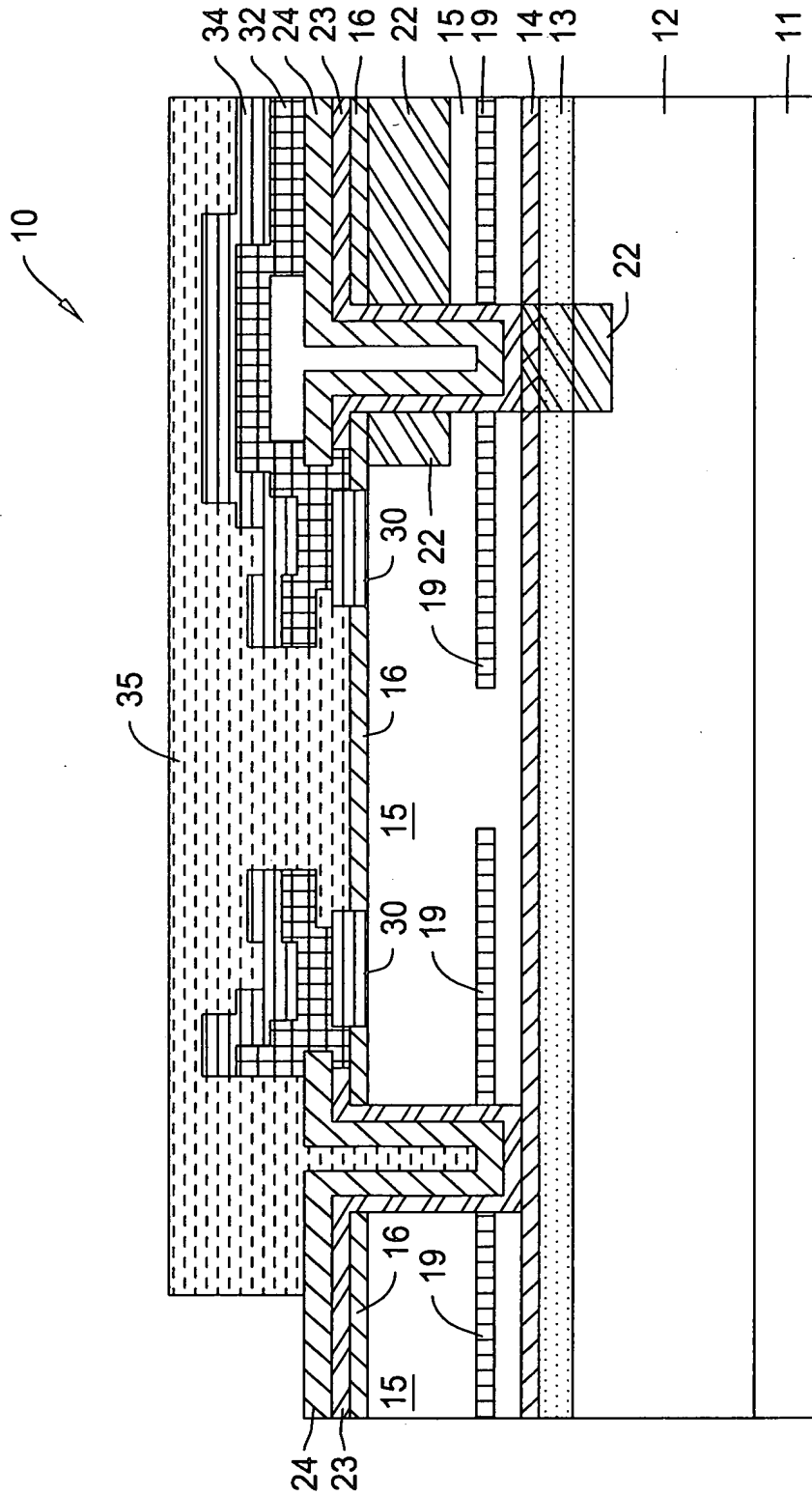


Figure 27

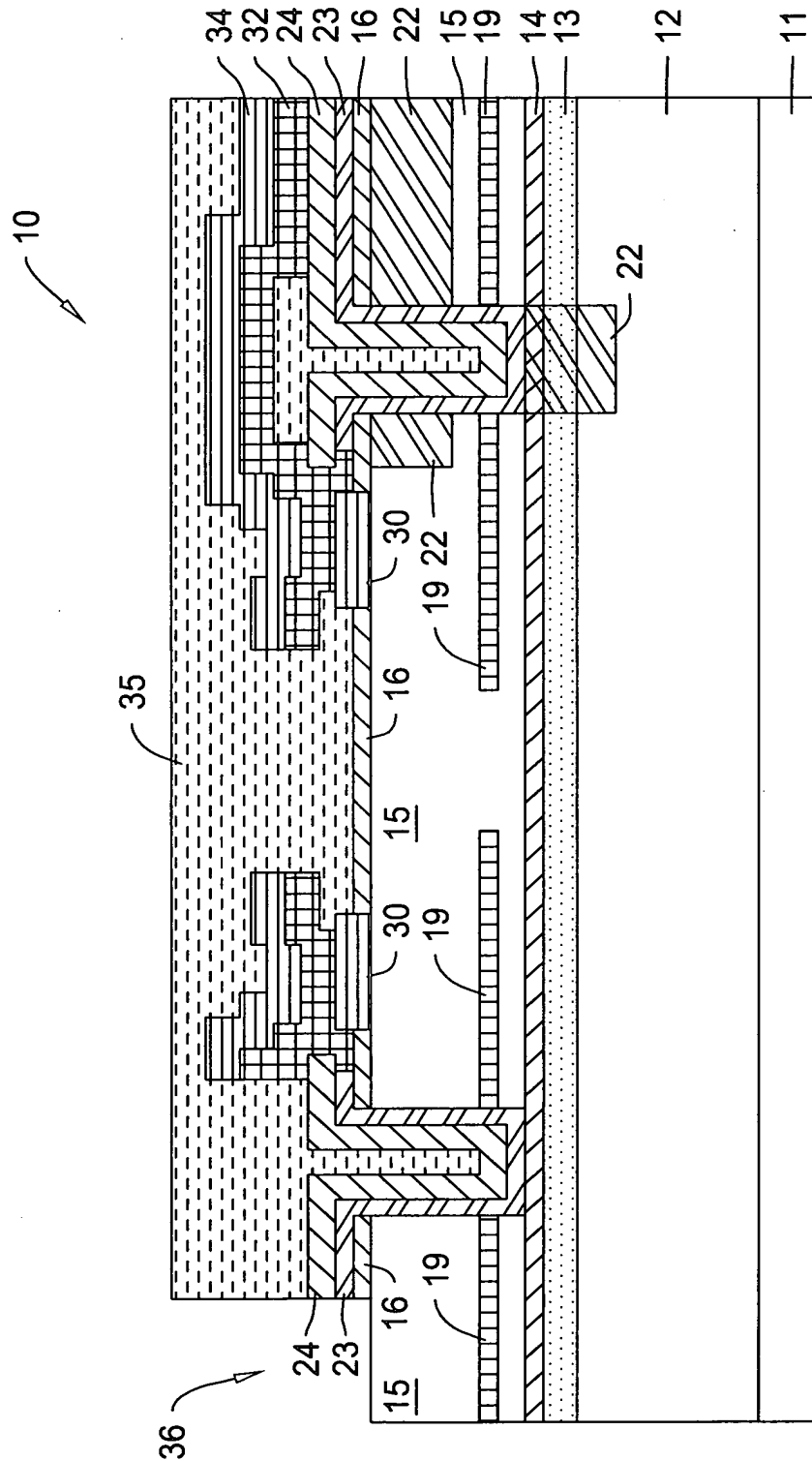


Figure 28

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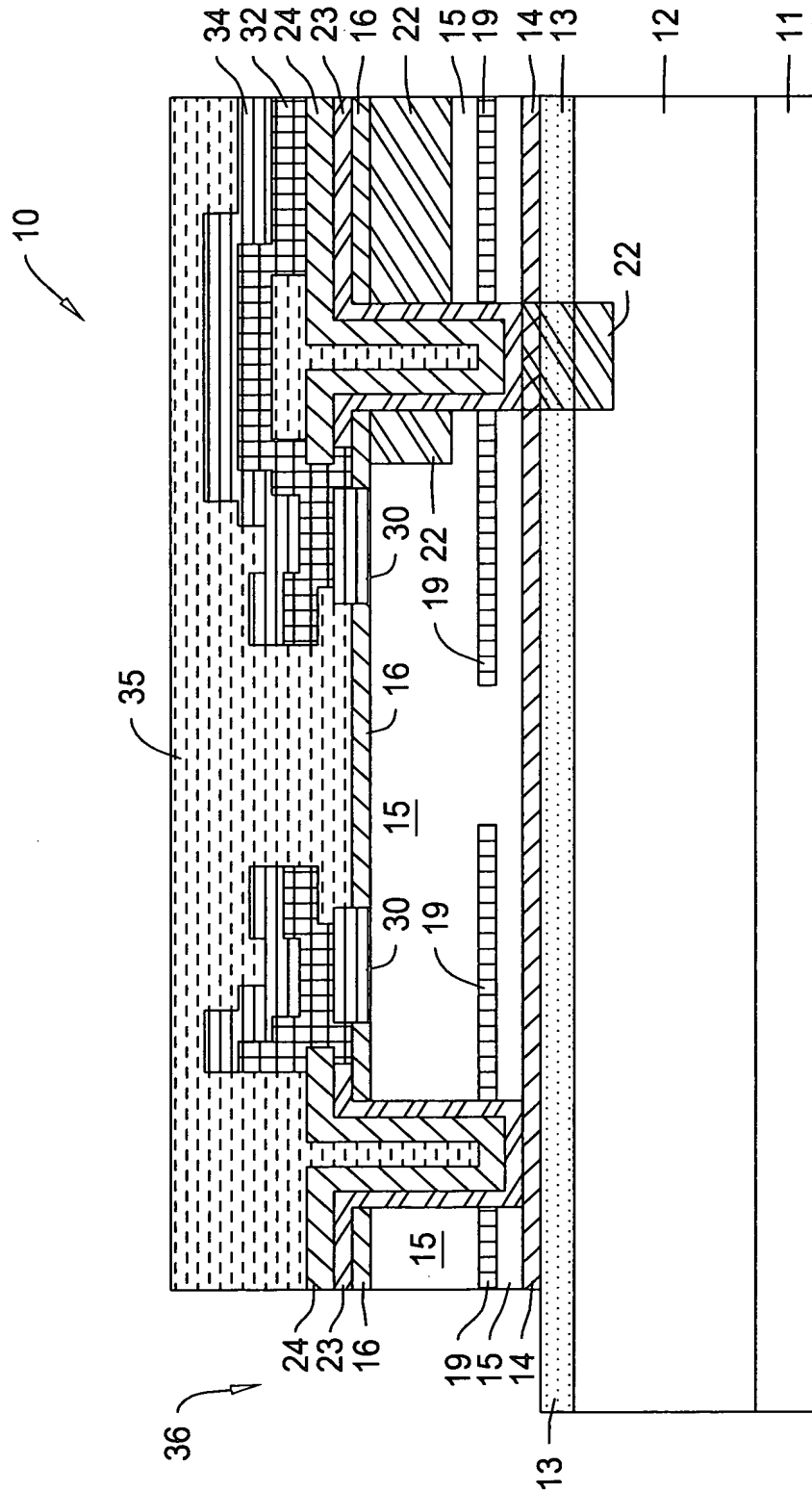


Figure 29

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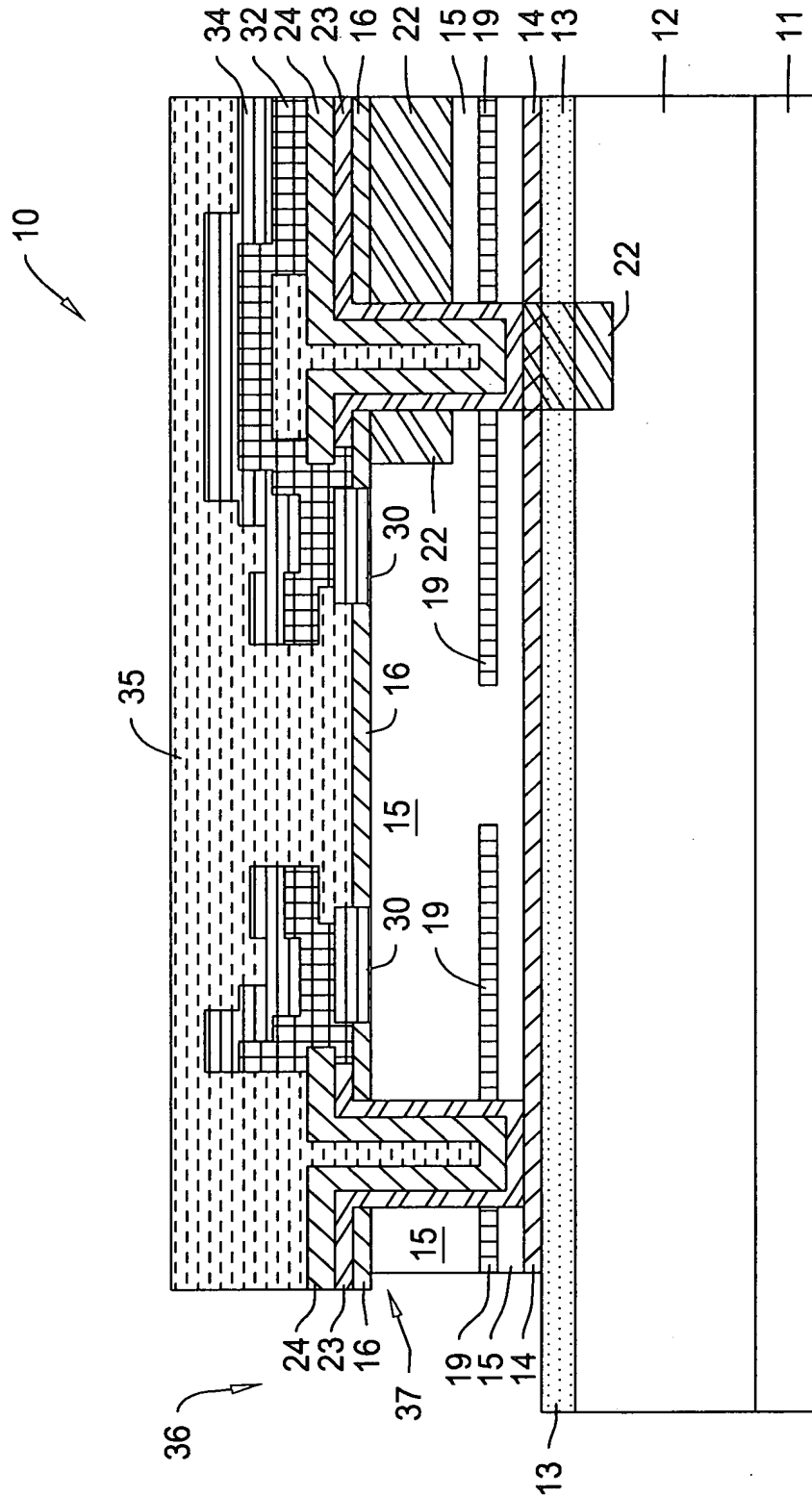


Figure 30

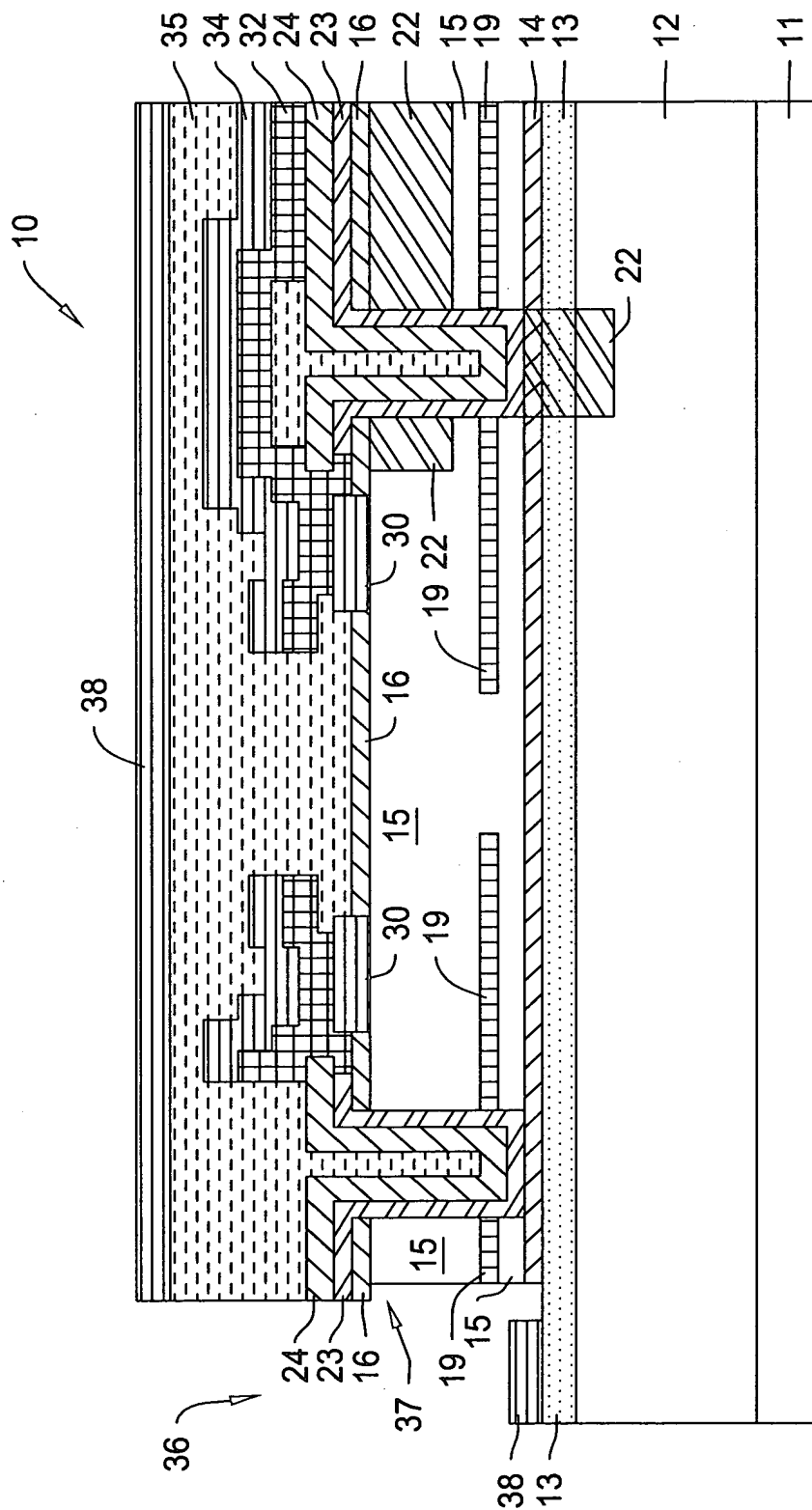
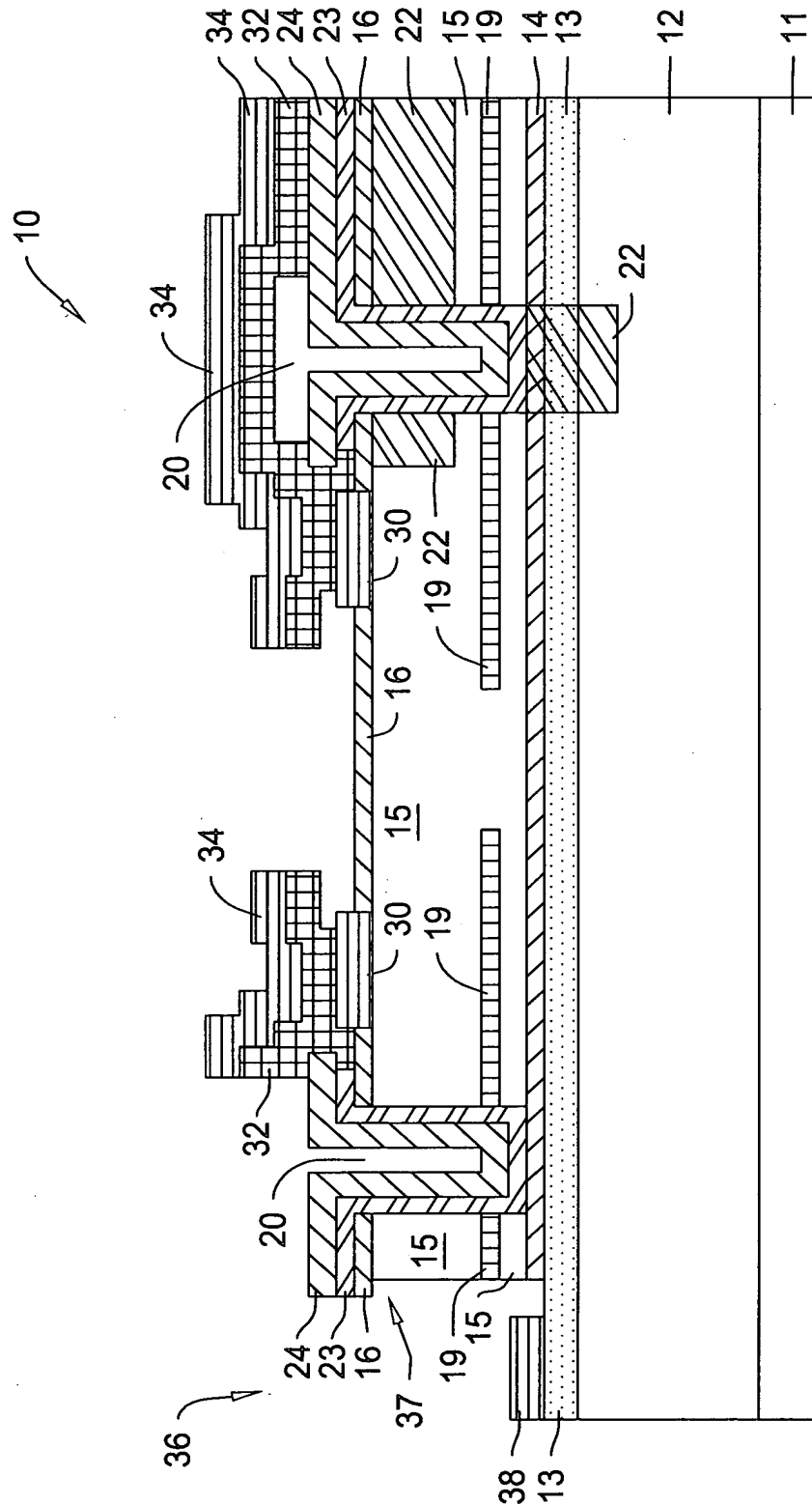


Figure 31



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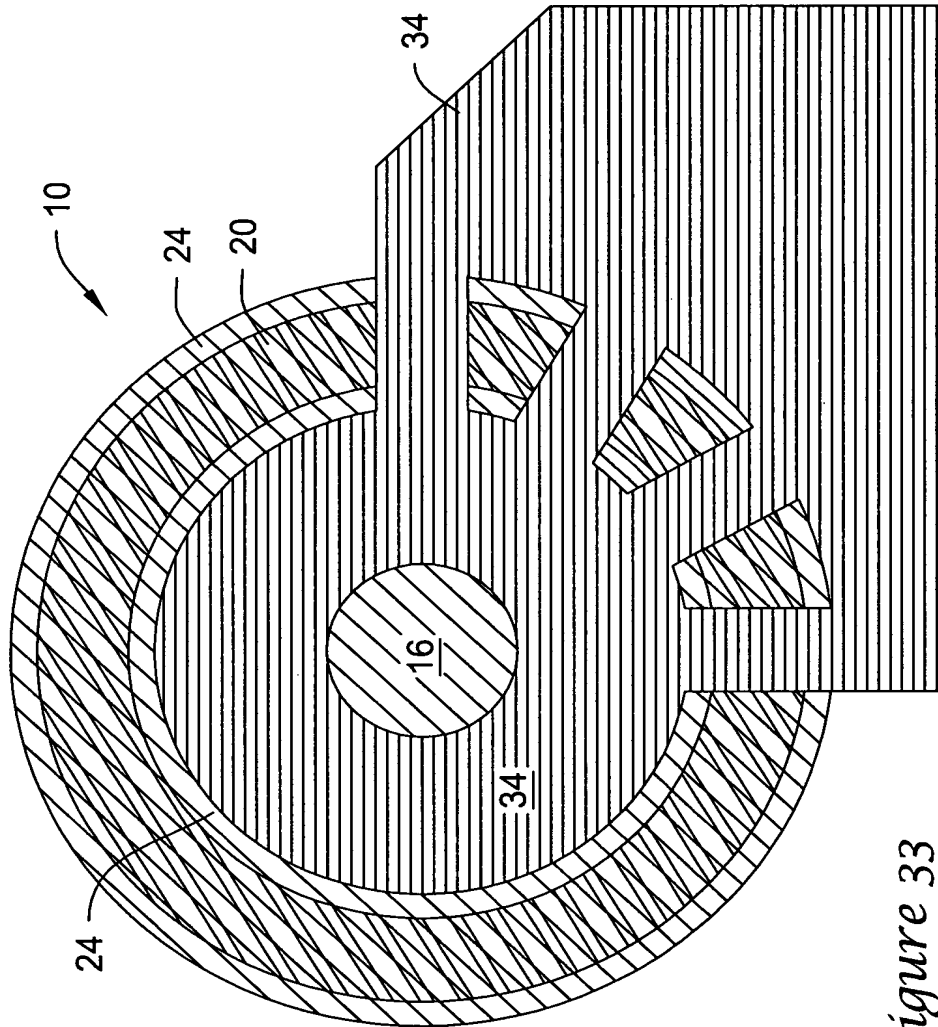


Figure 33

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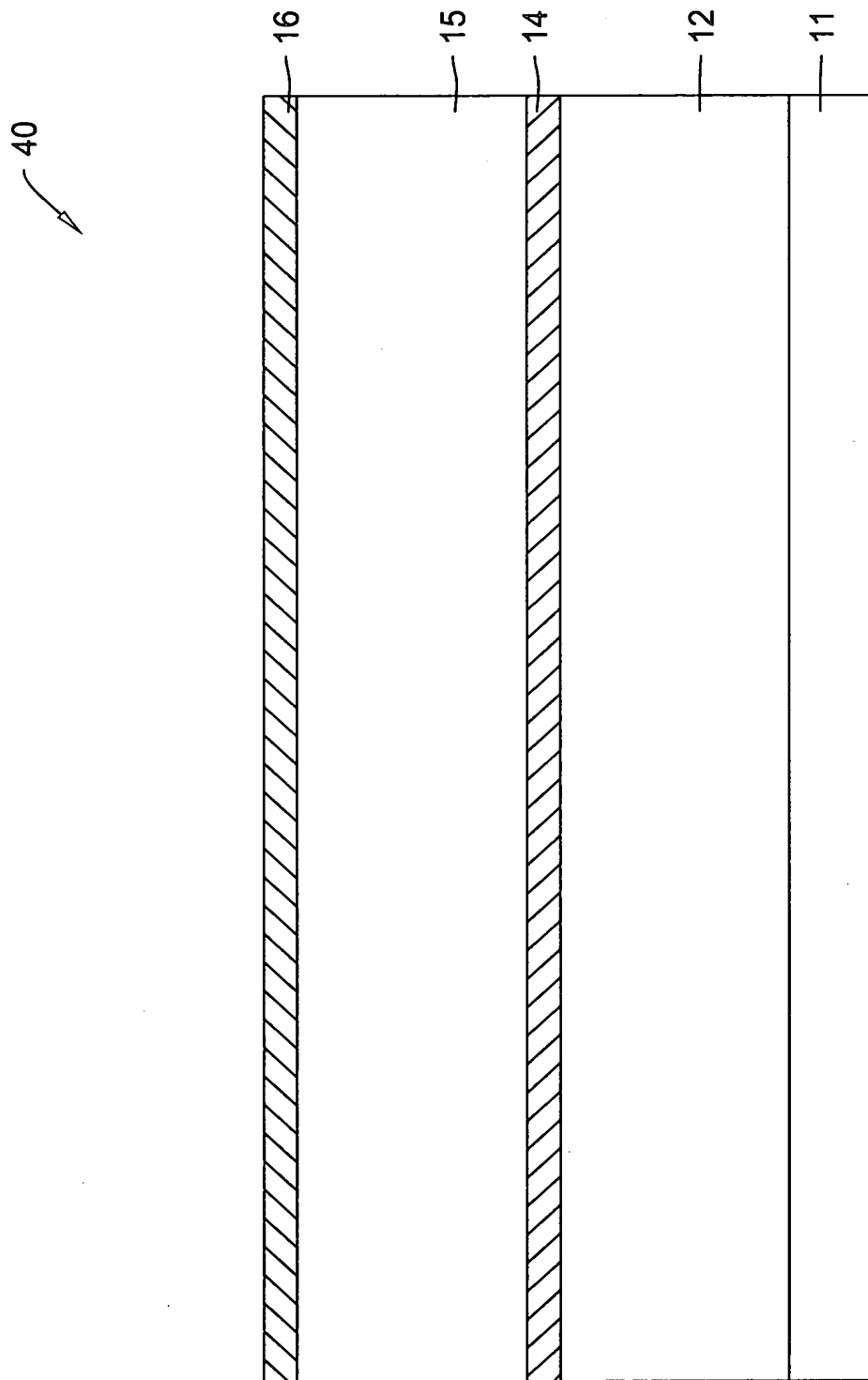


Figure 34

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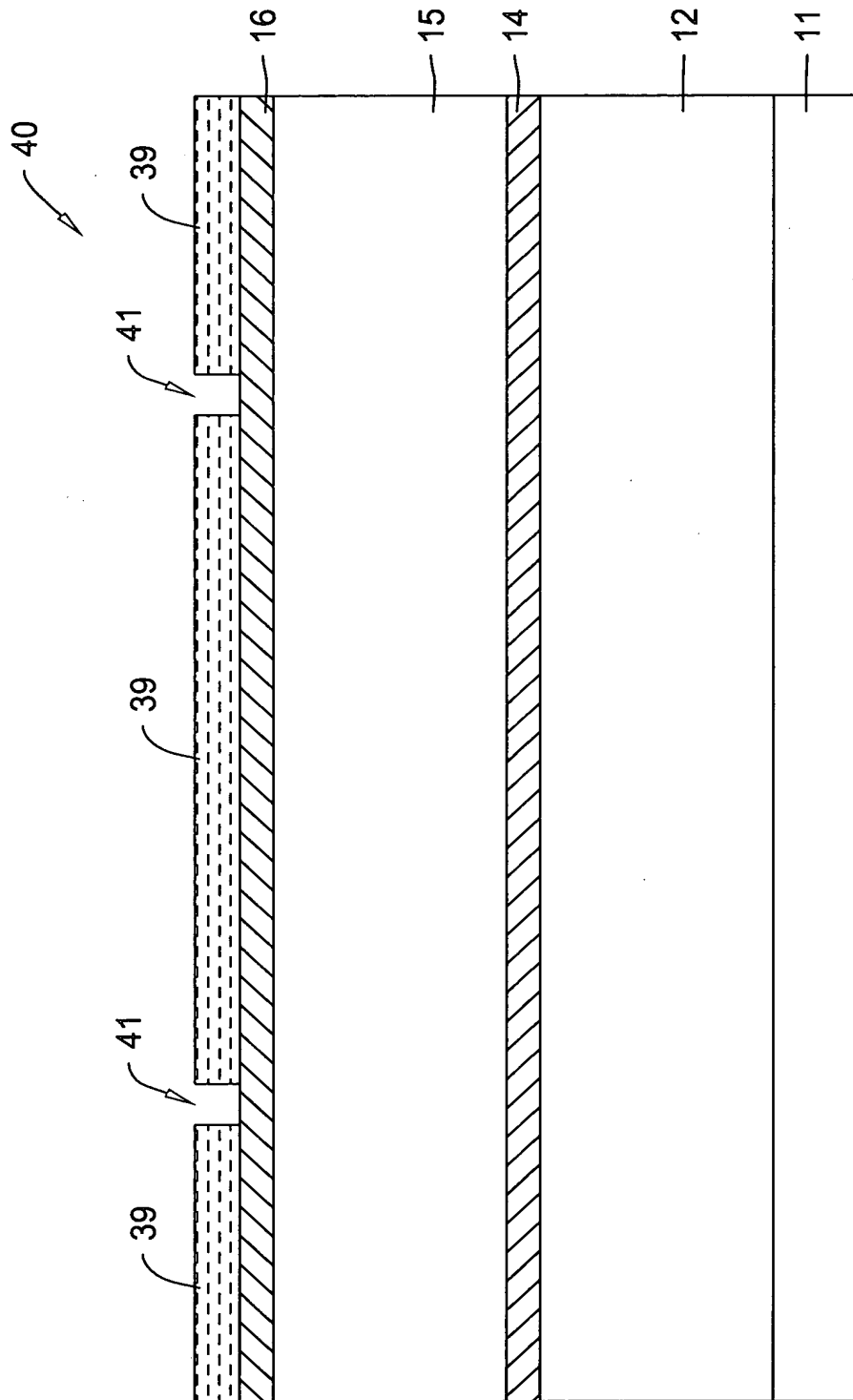


Figure 35

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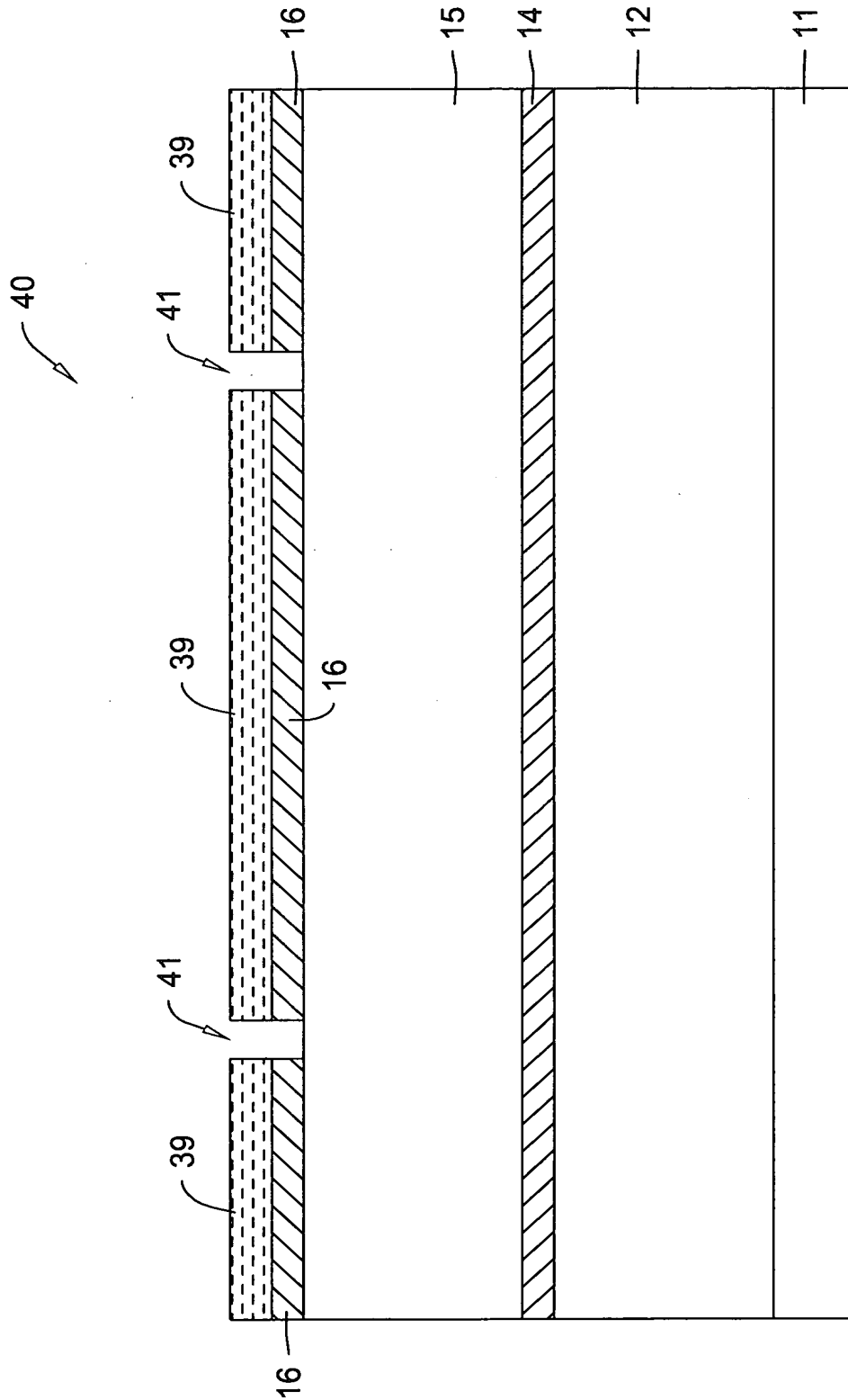


Figure 36

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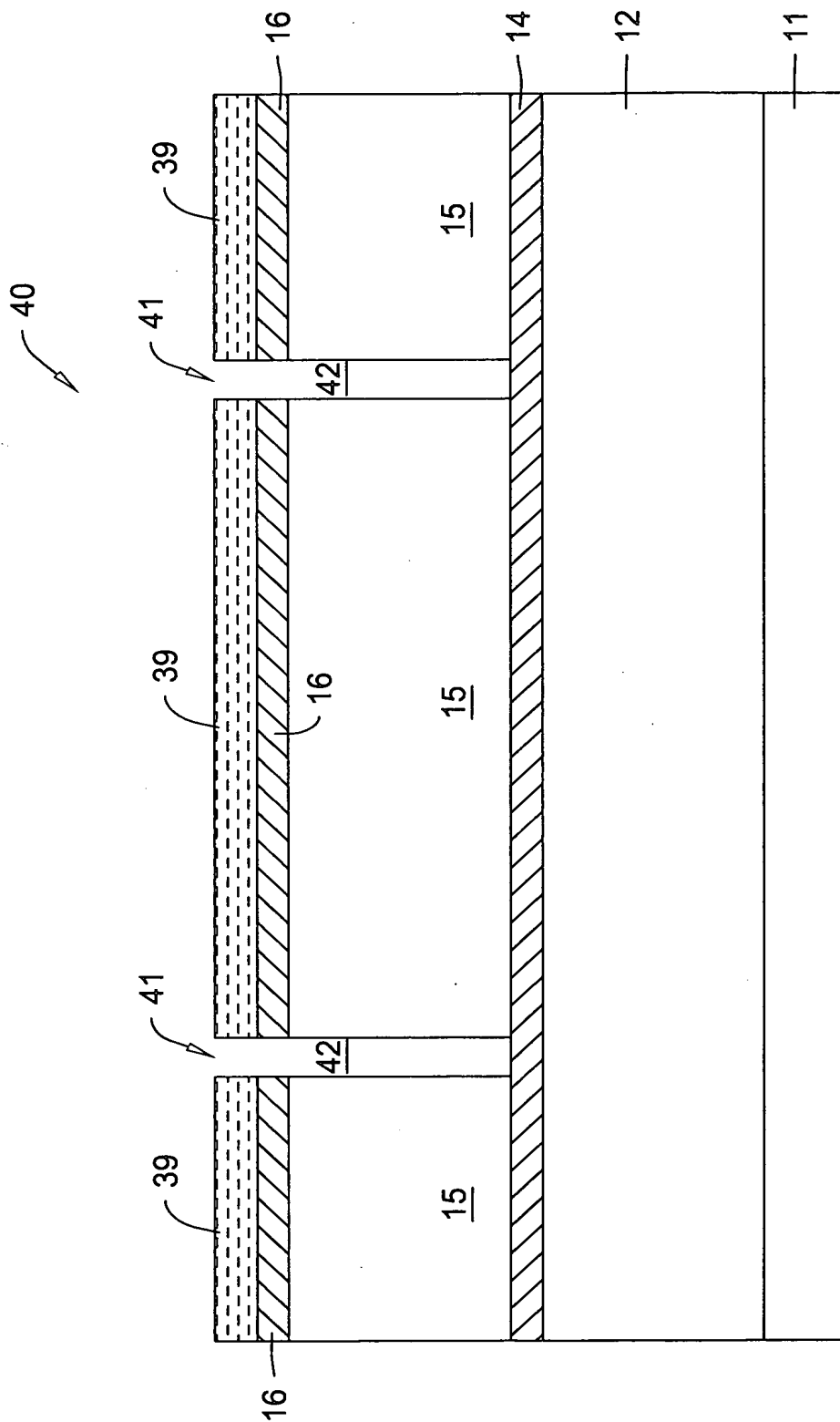


Figure 37

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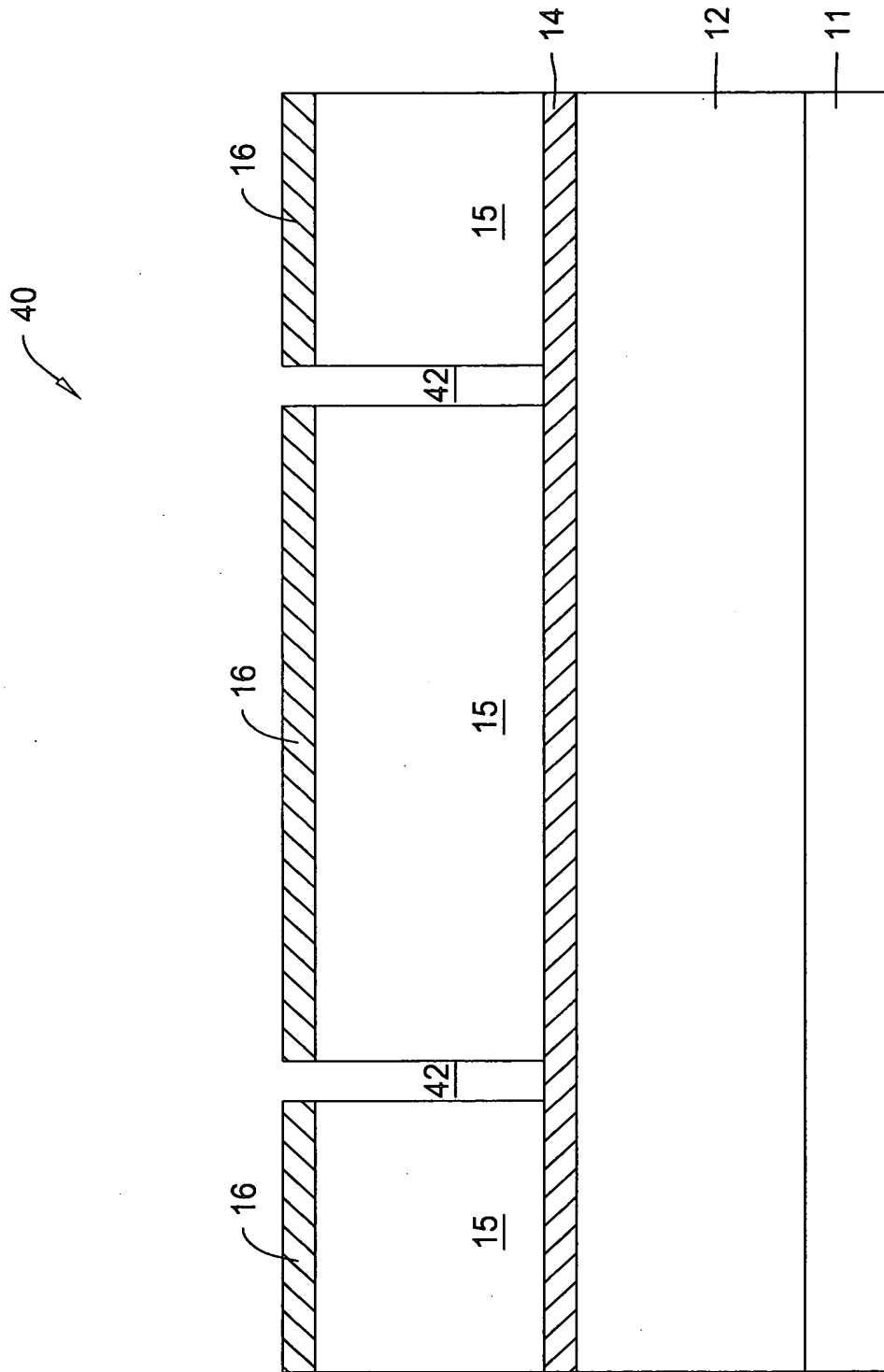


Figure 38

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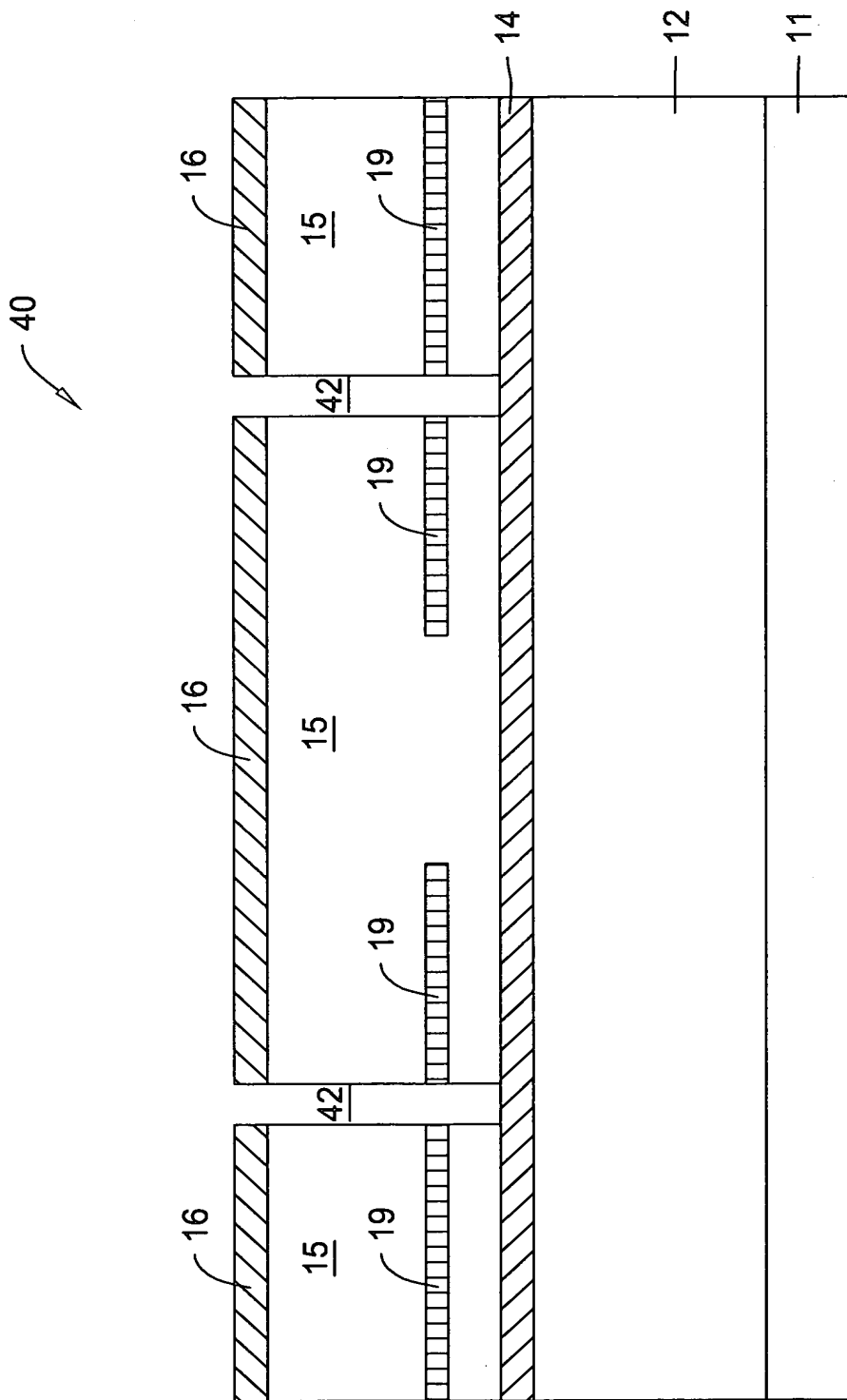


Figure 39

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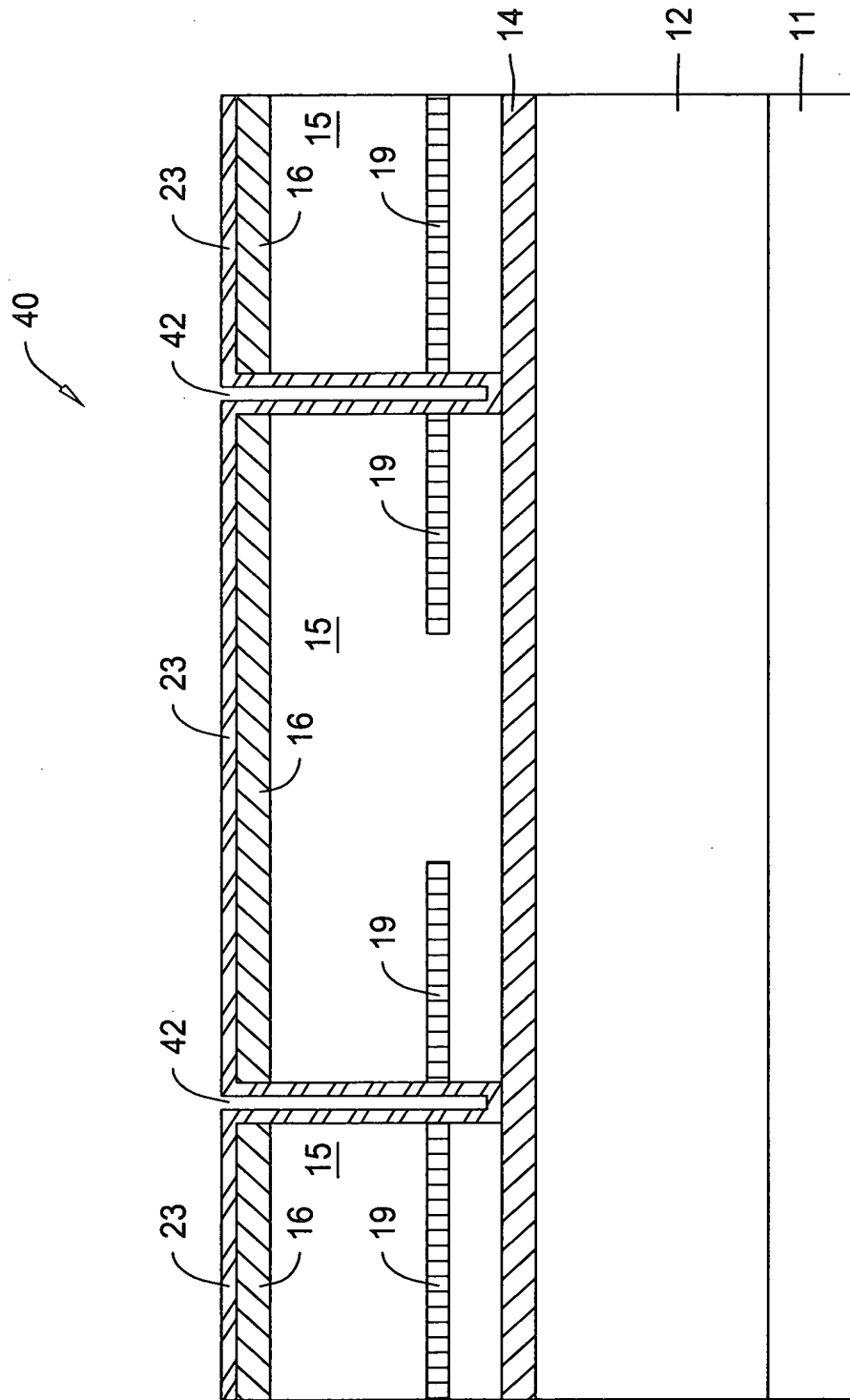


Figure 40

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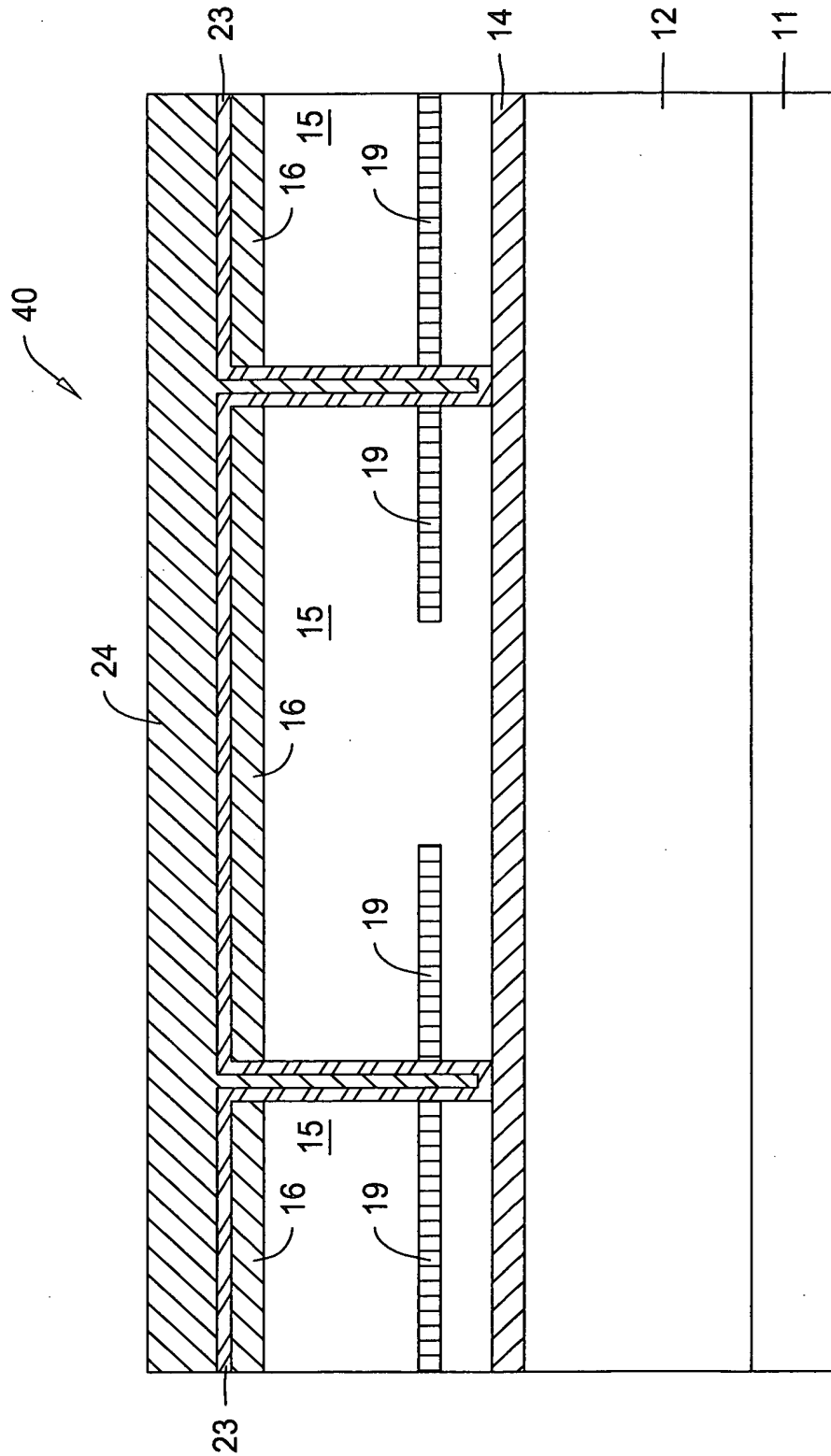


Figure 41

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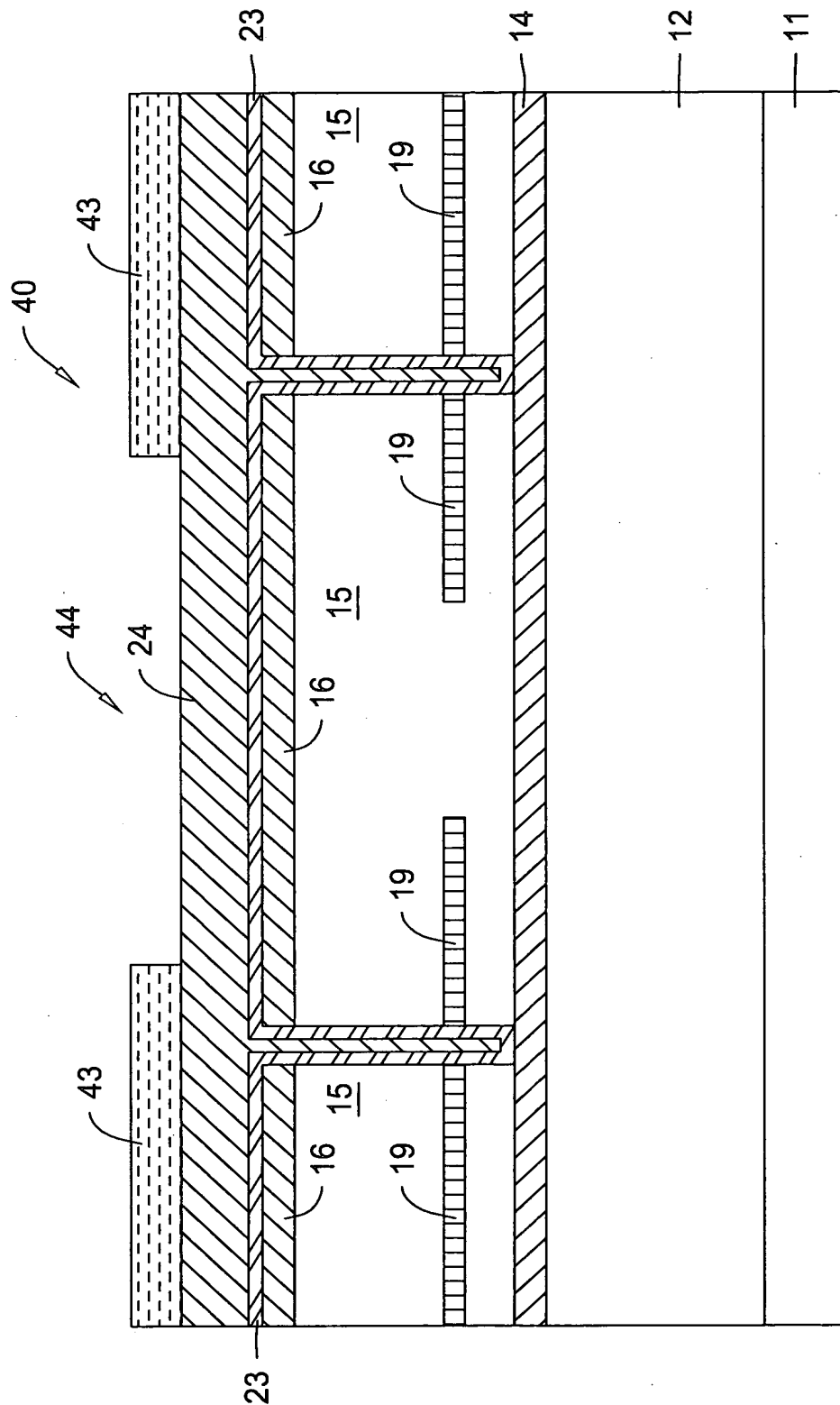


Figure 42

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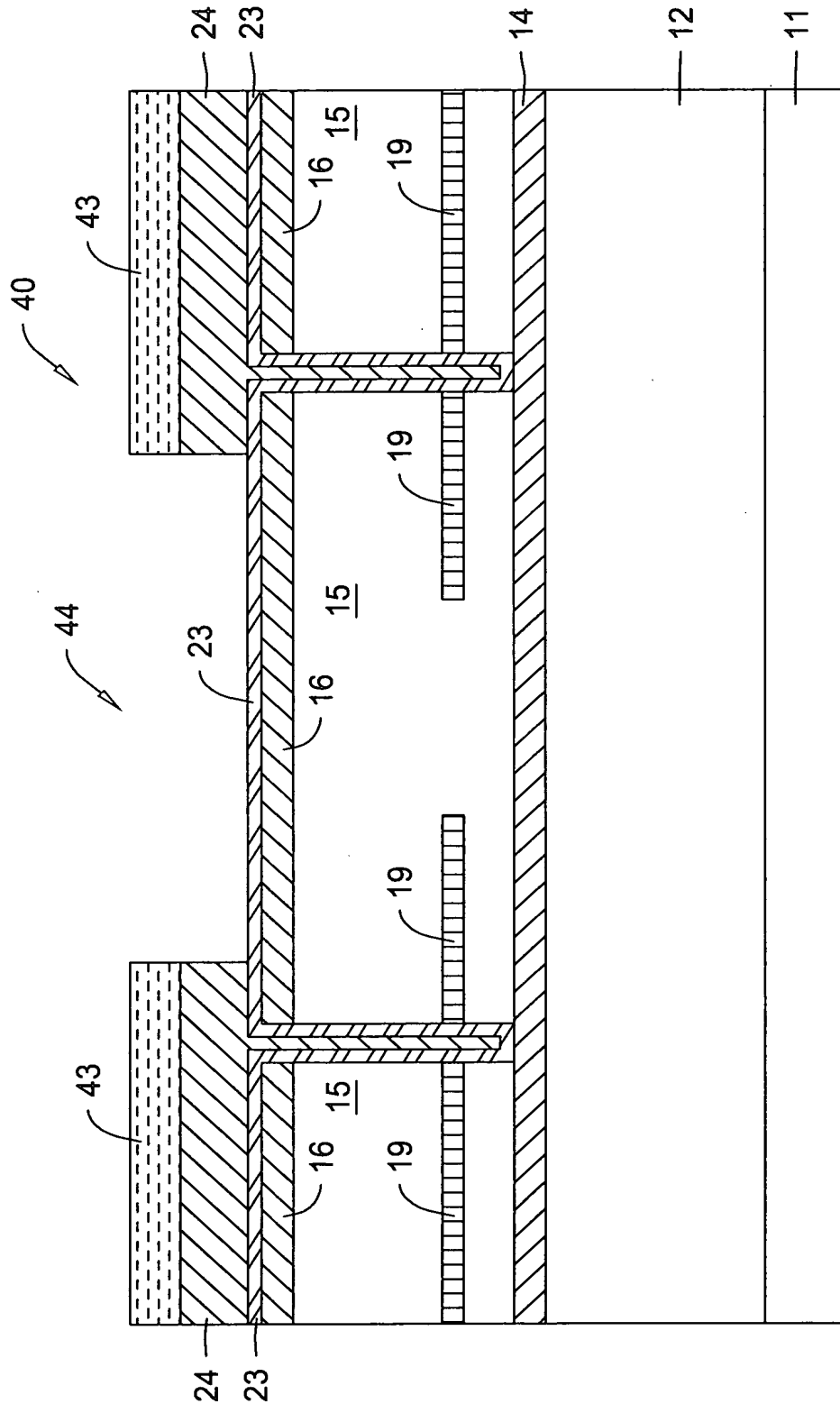


Figure 43

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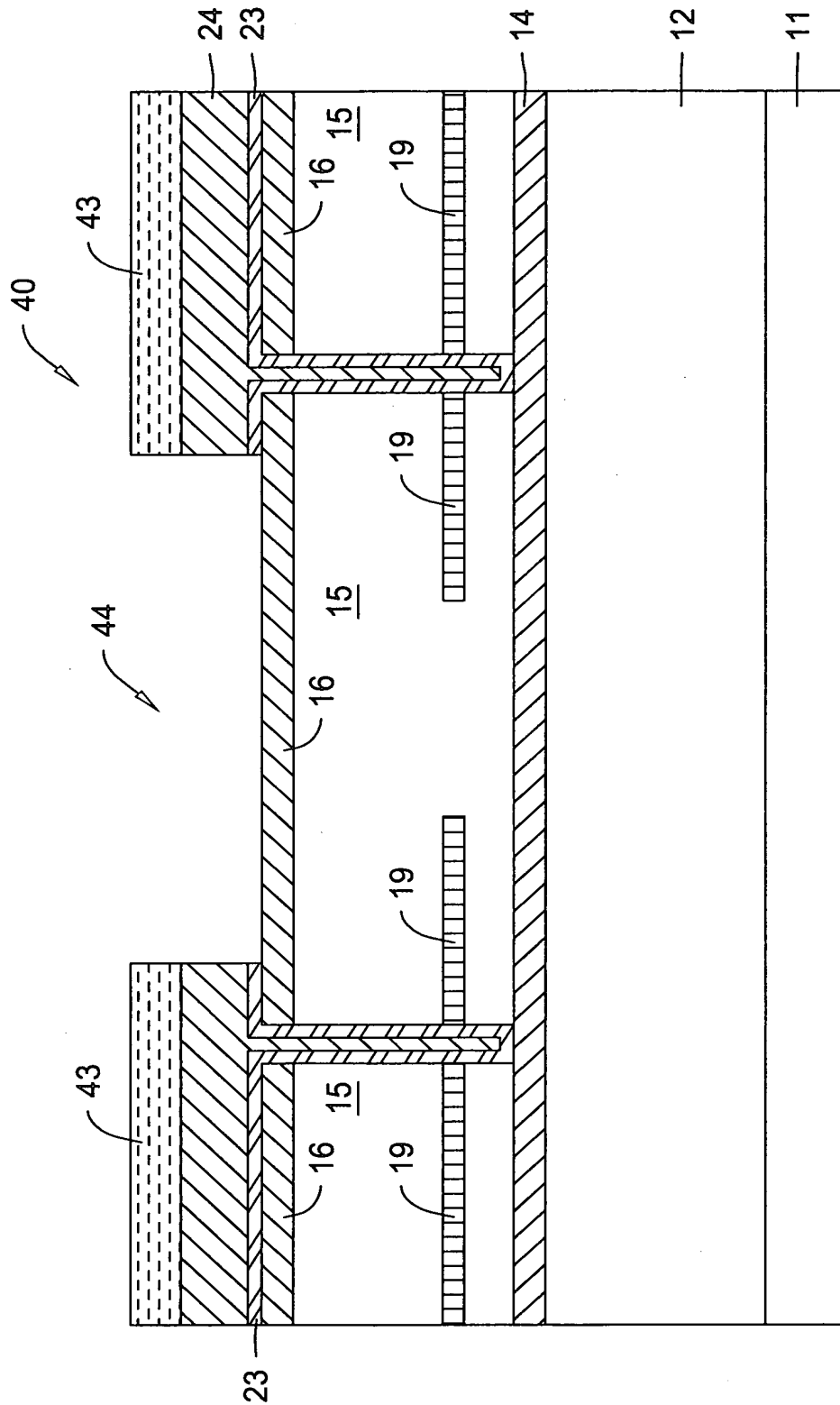


Figure 44

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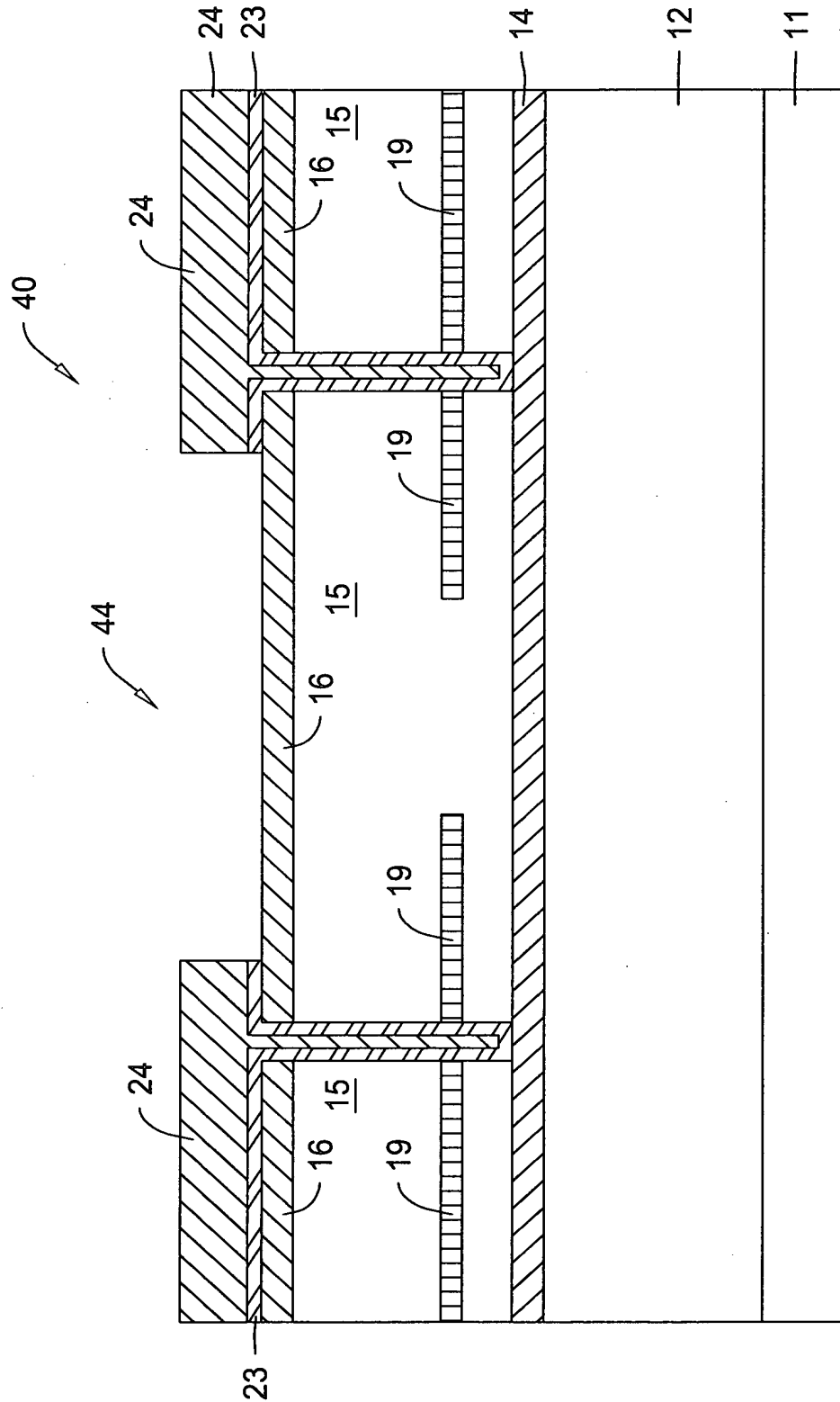


Figure 45

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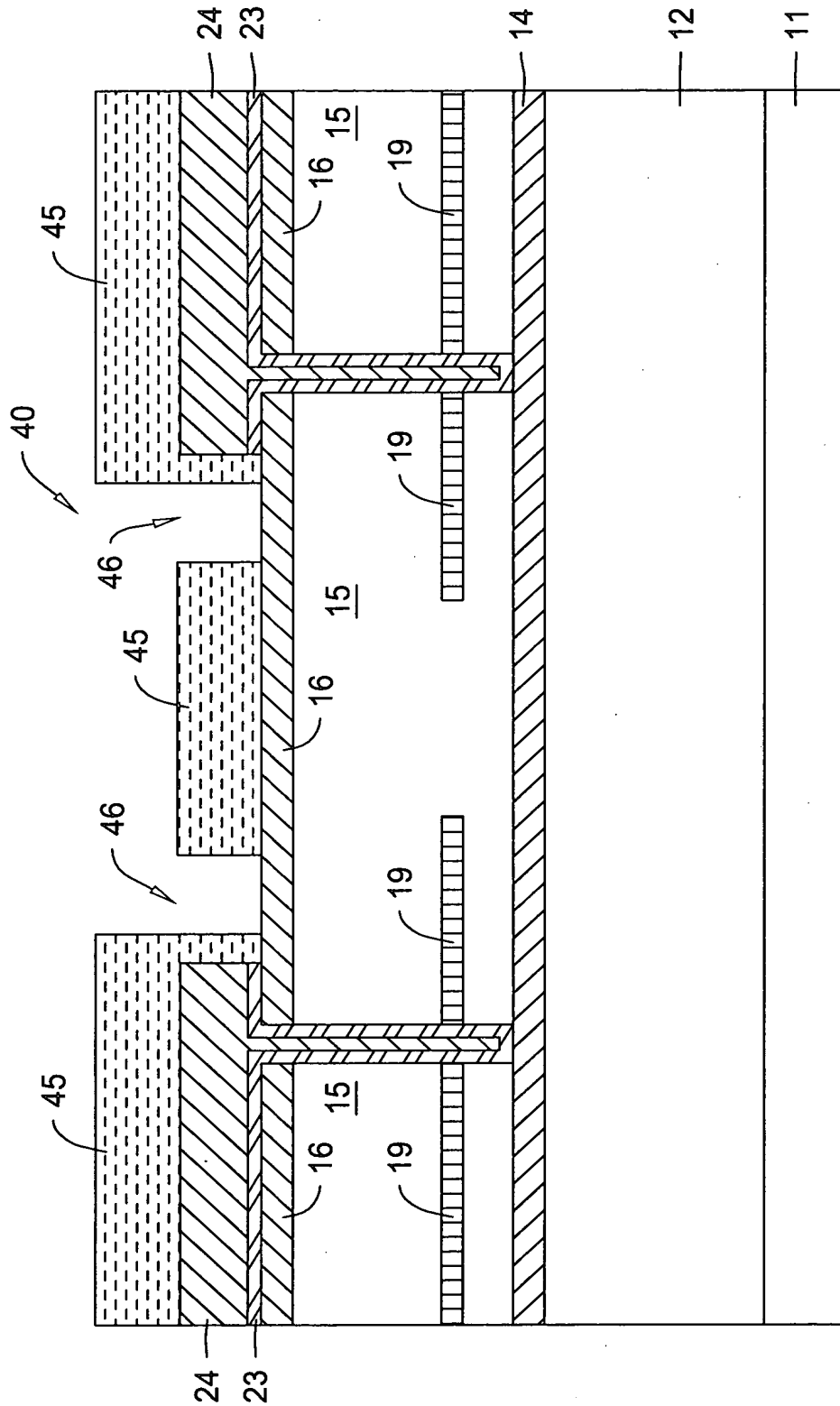


Figure 46

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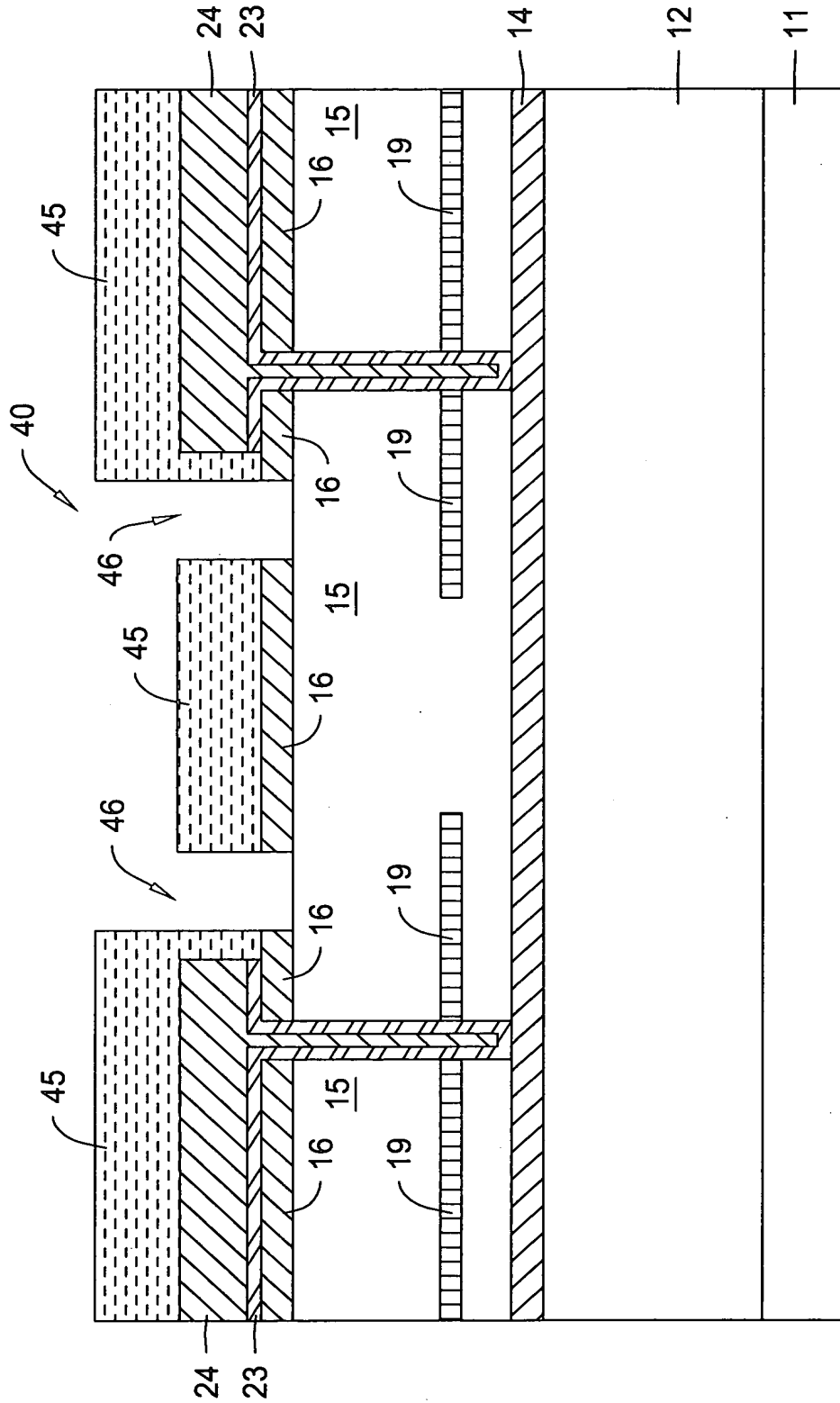


Figure 47

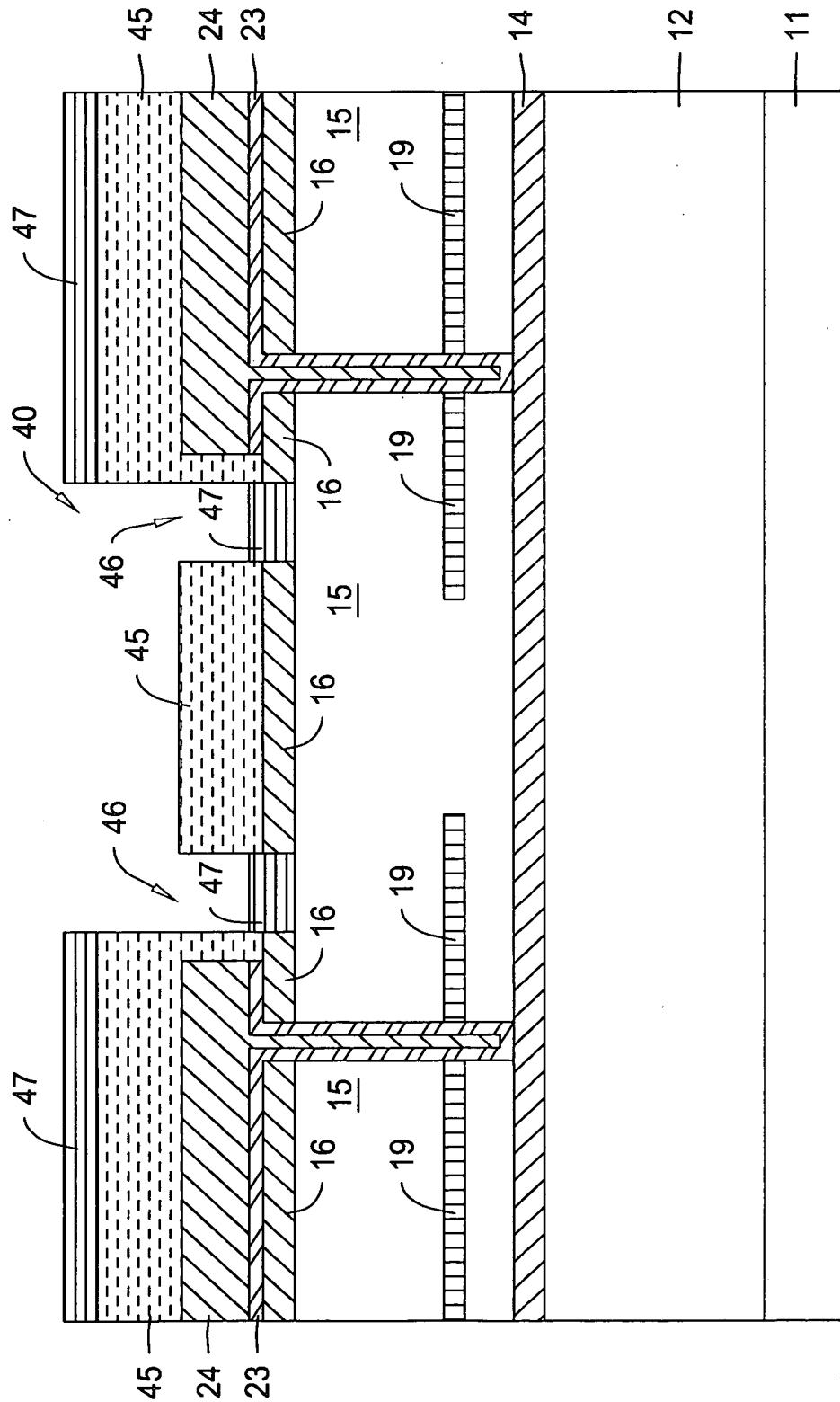


Figure 48

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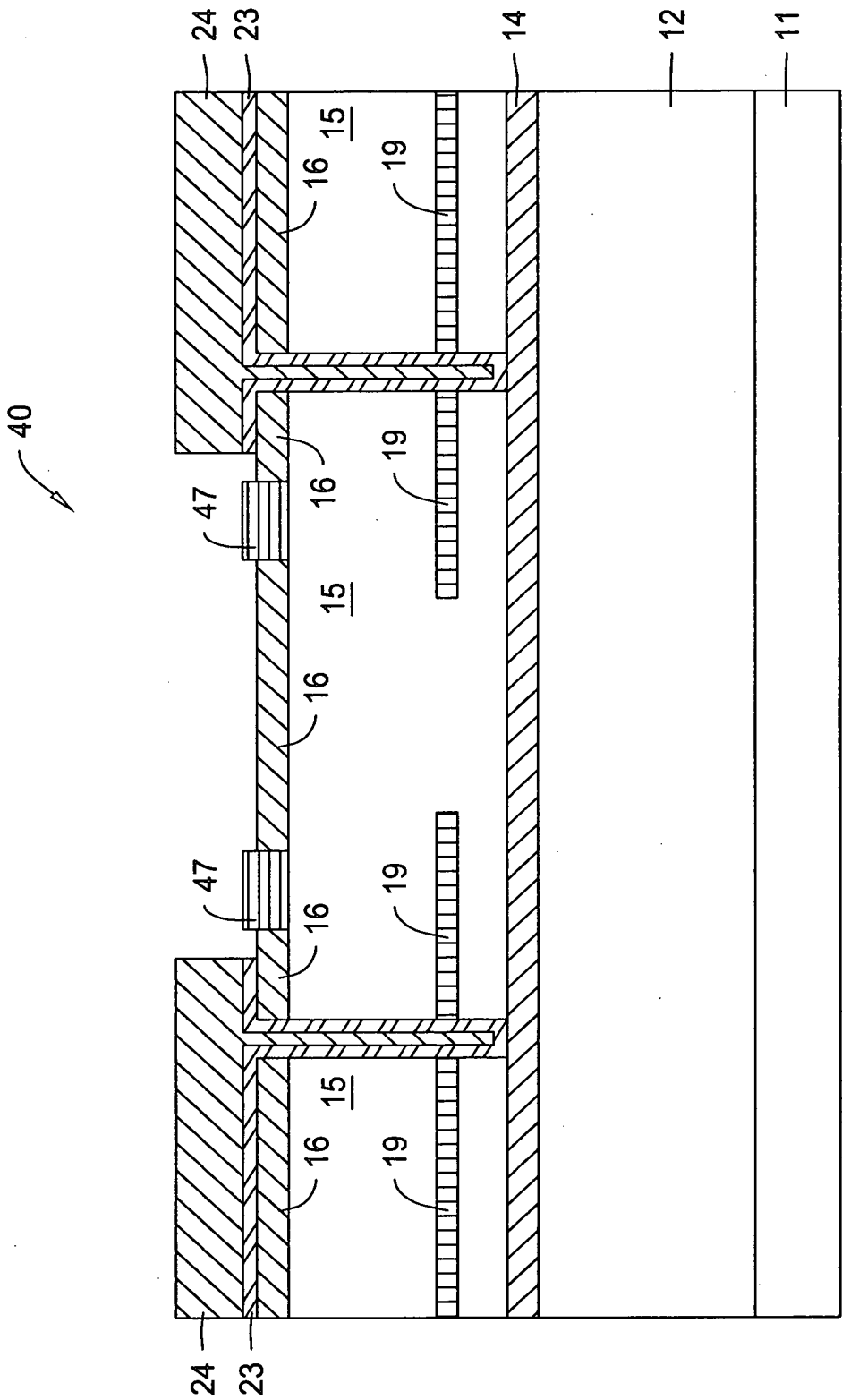


Figure 49

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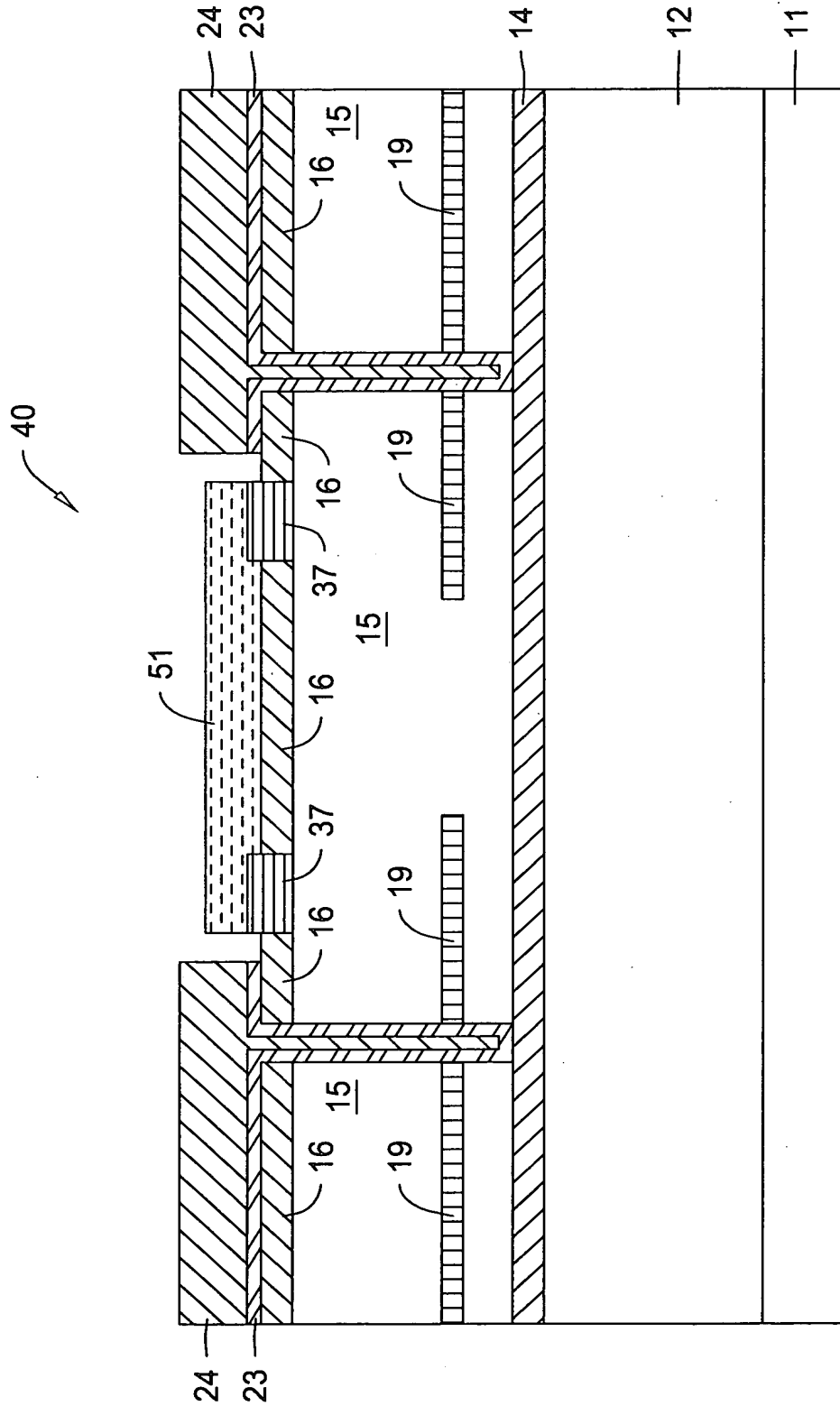


Figure 50

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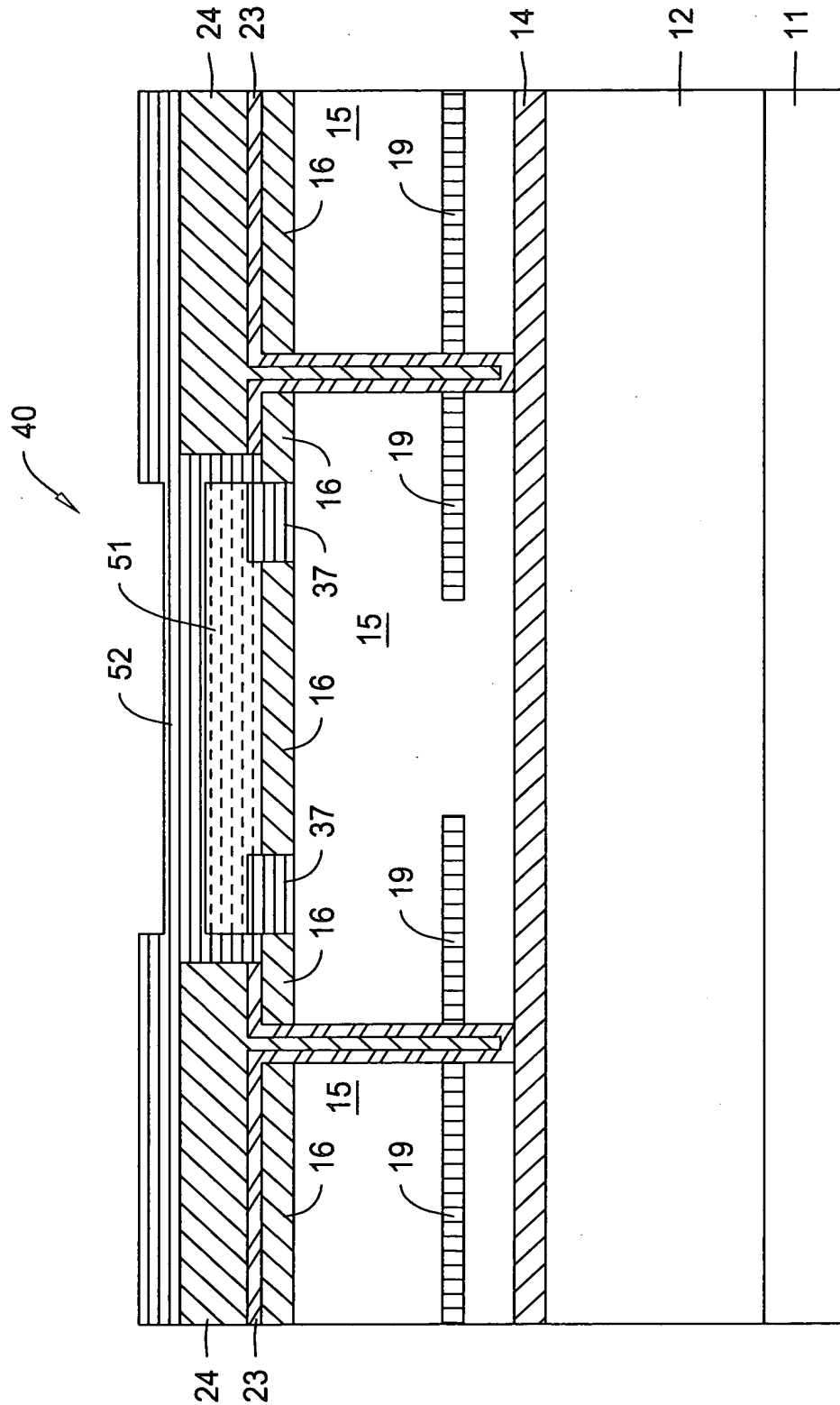


Figure 51

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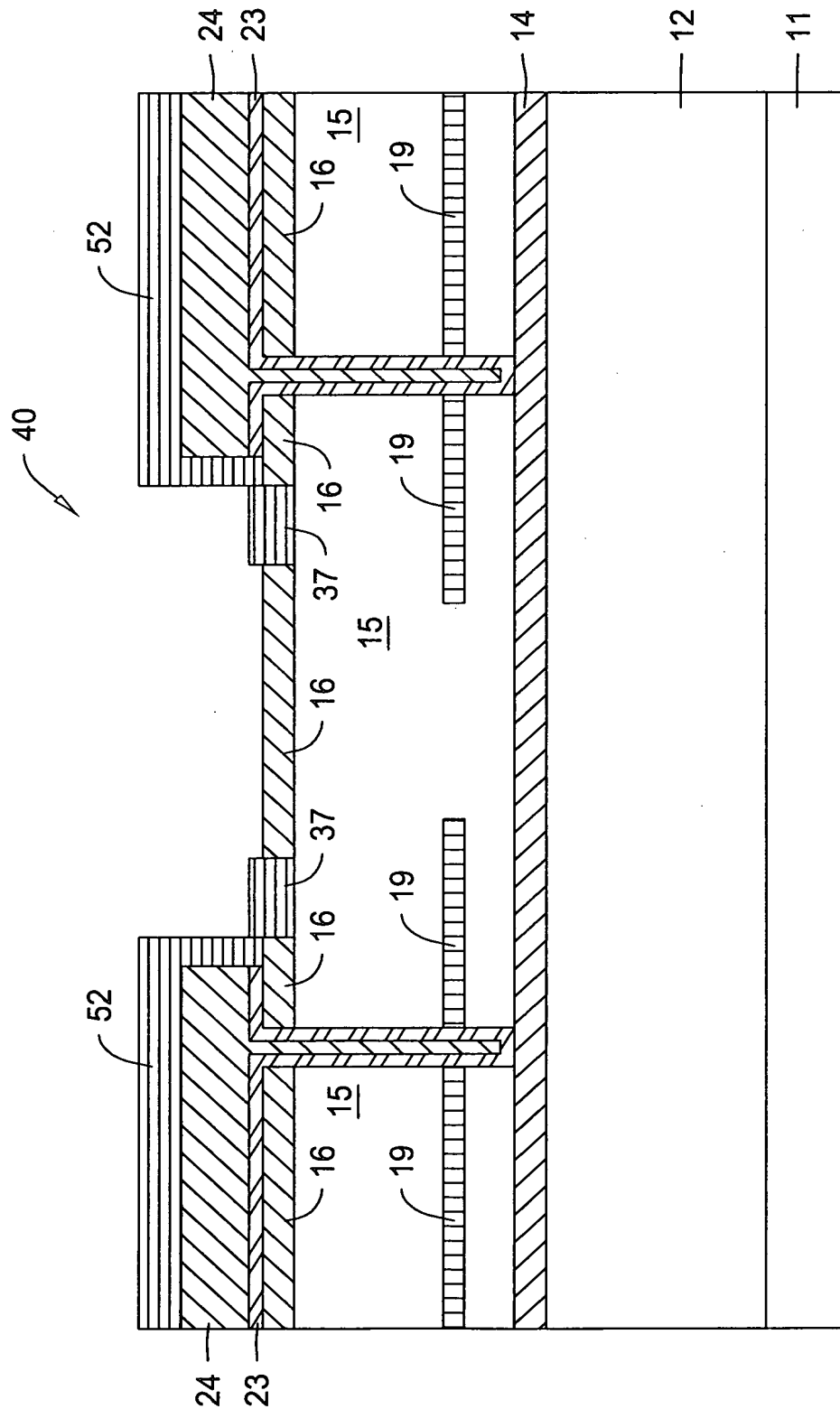


Figure 52

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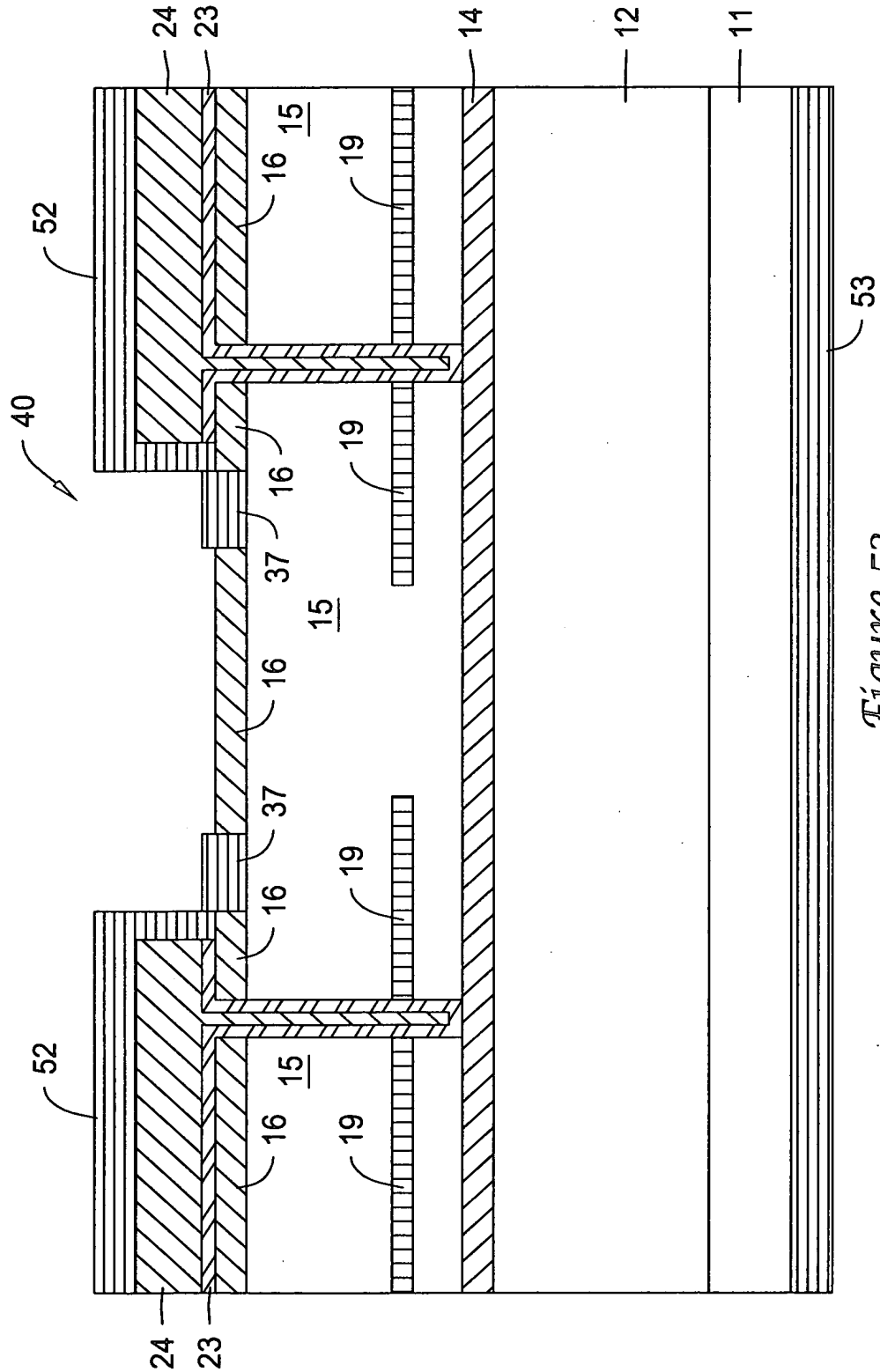


Figure 53

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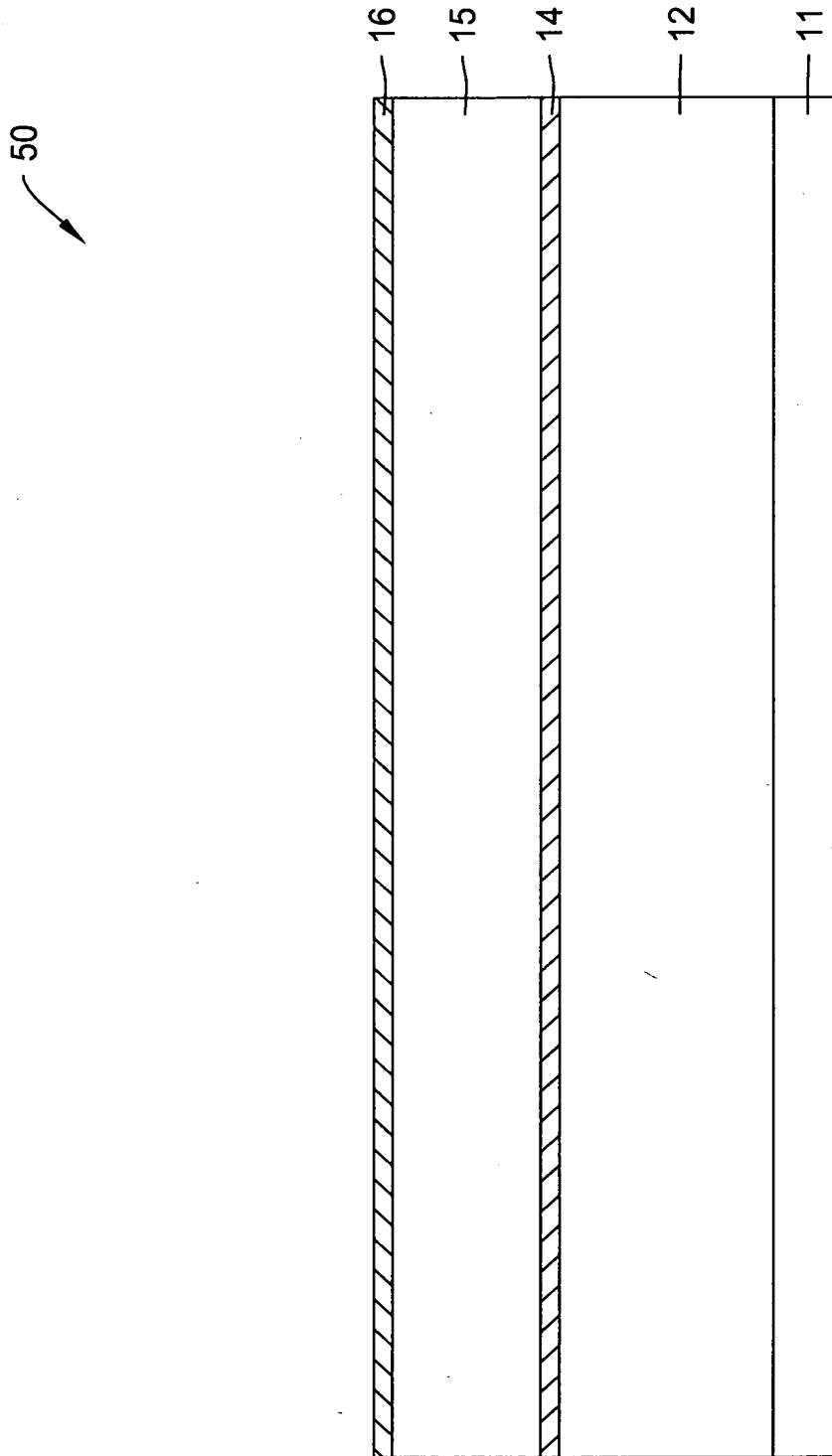


Figure 54

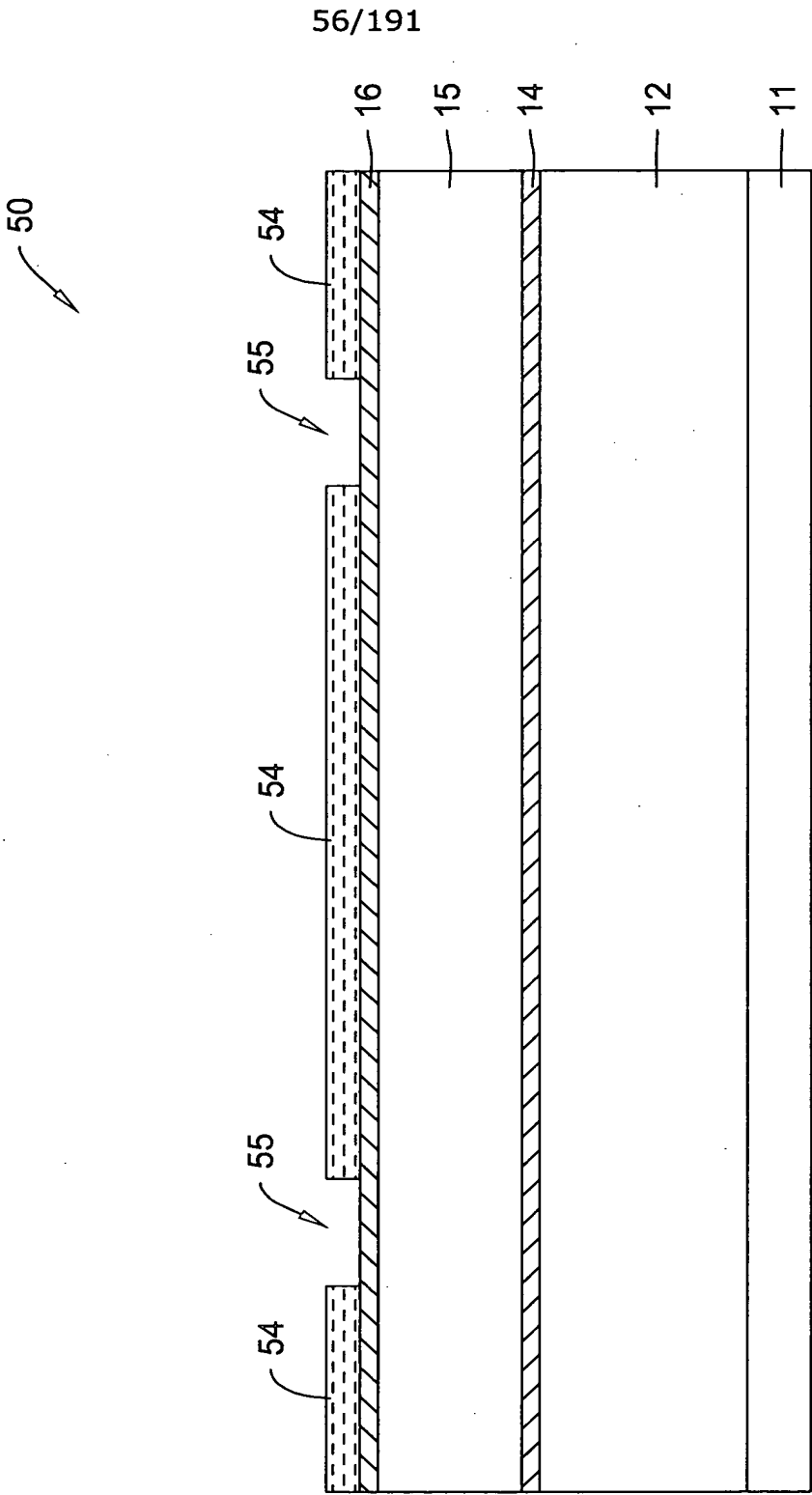


Figure 55

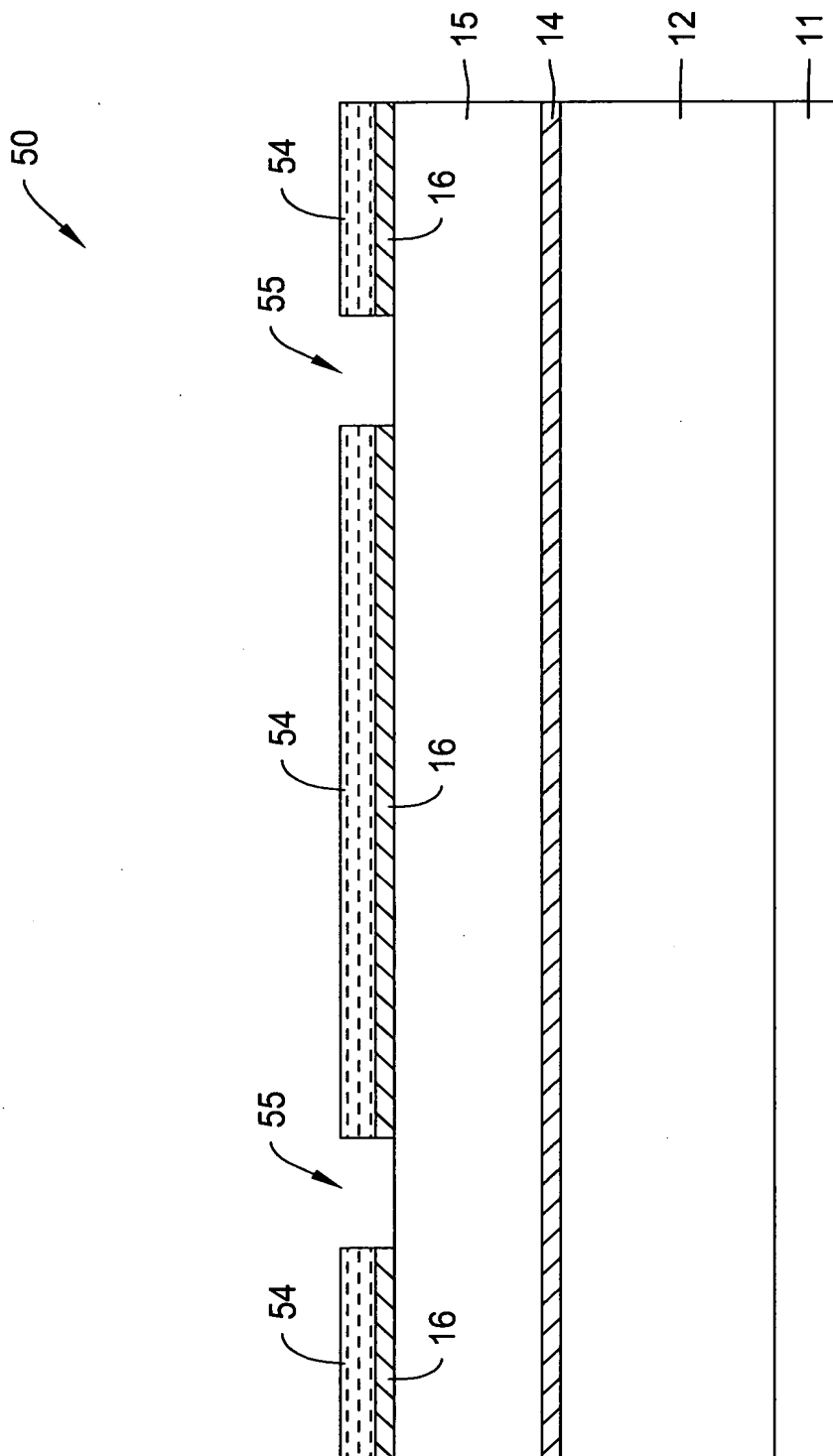


Figure 56

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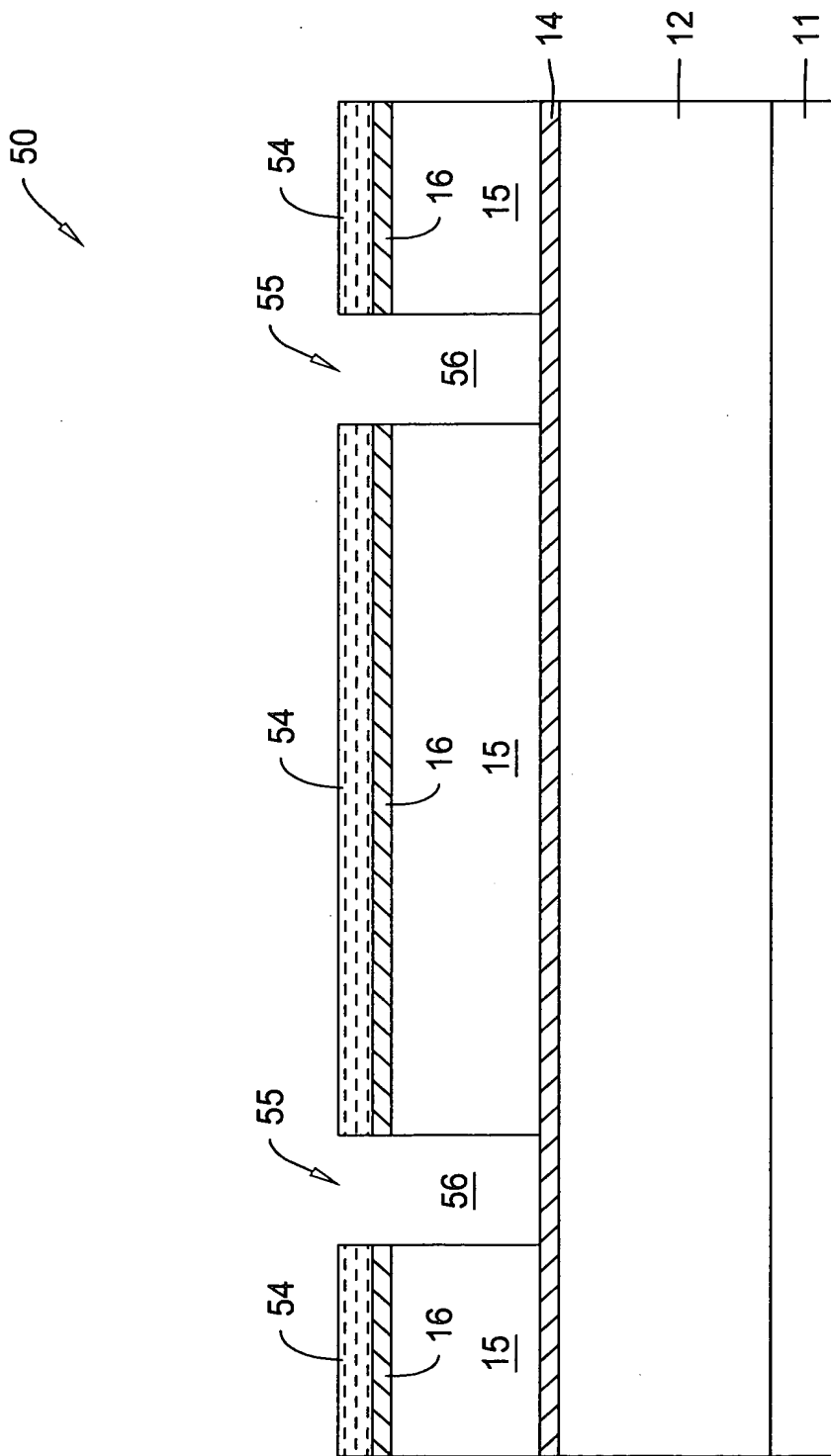


Figure 57

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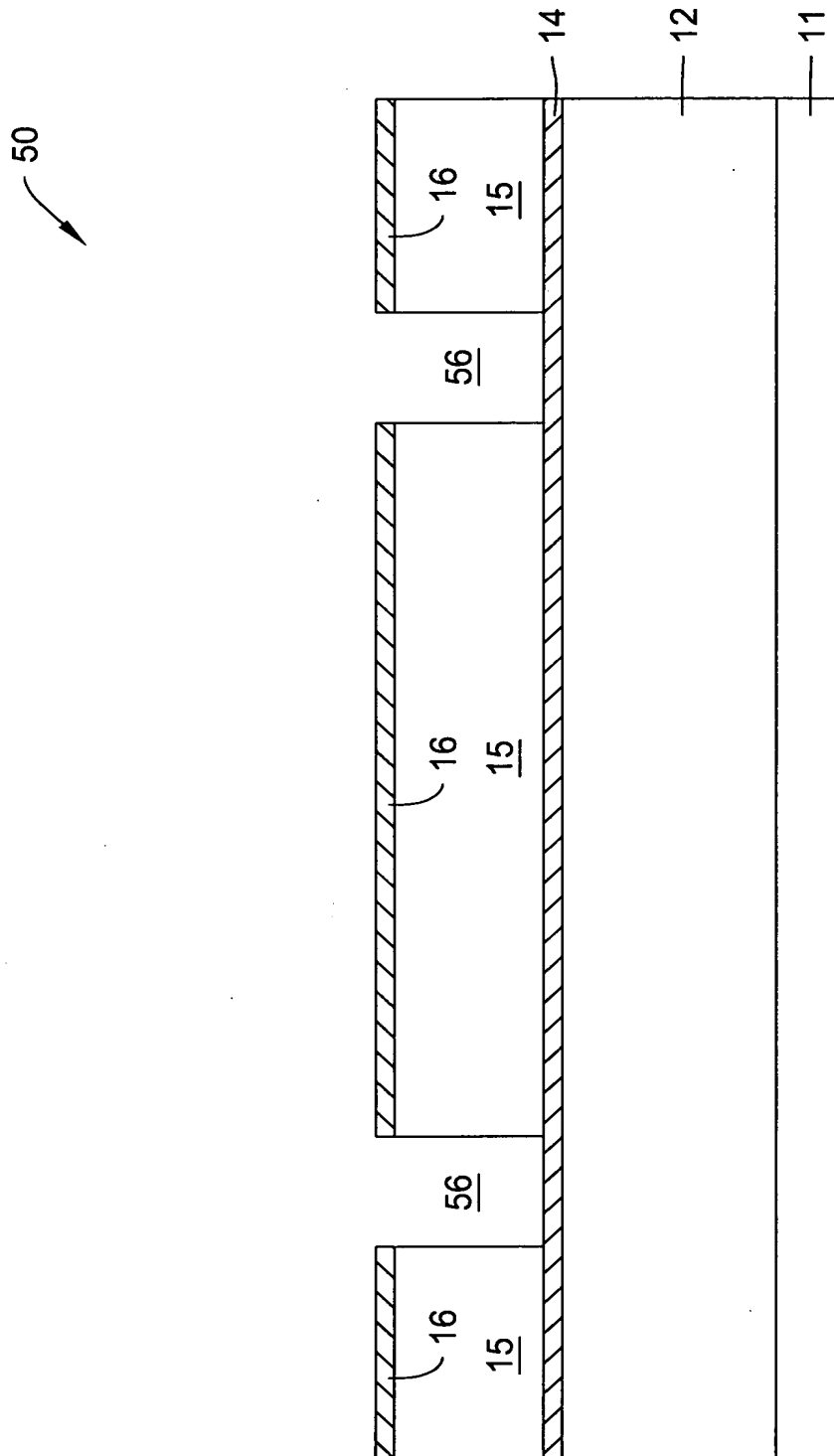
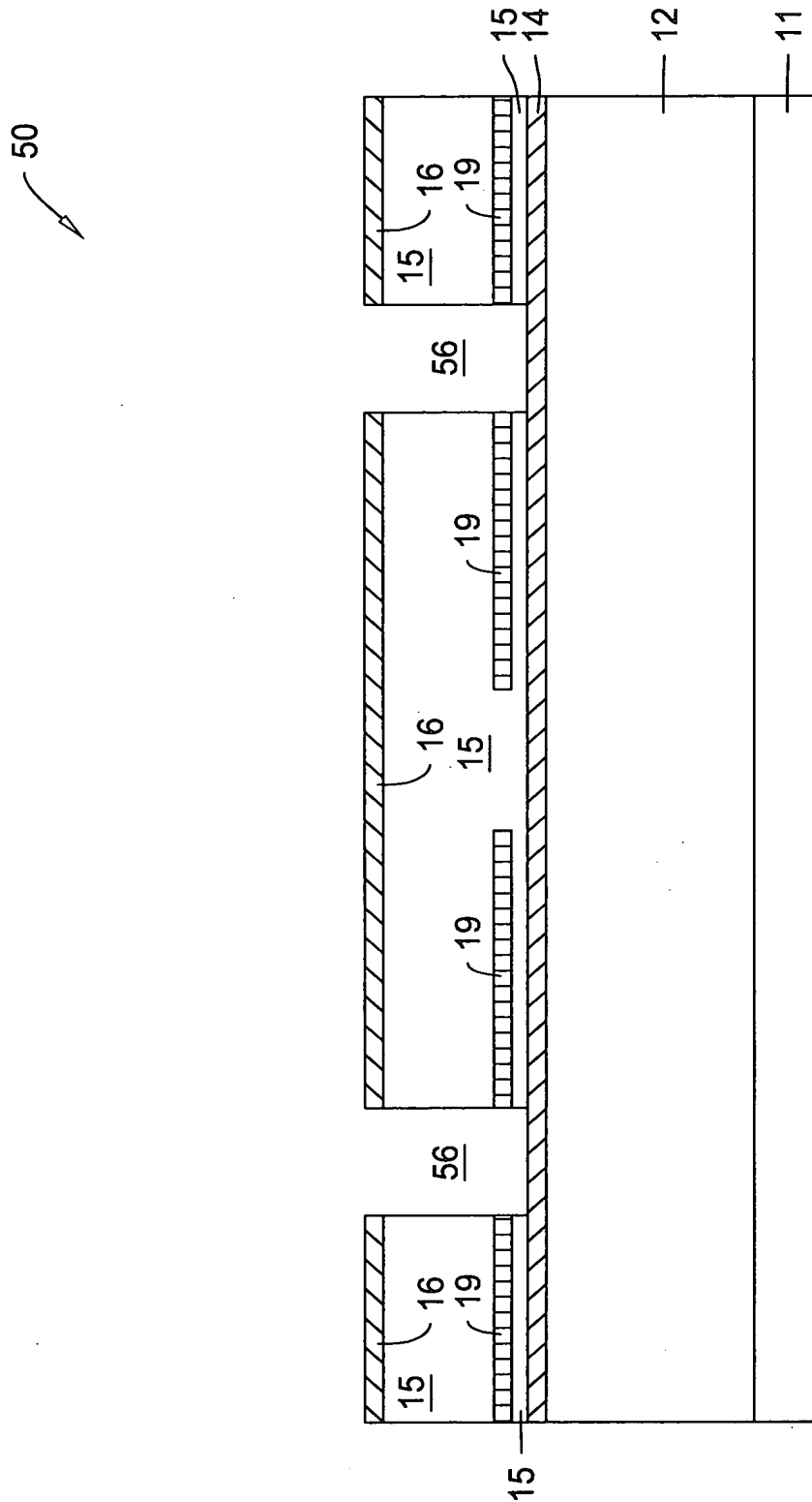


Figure 58



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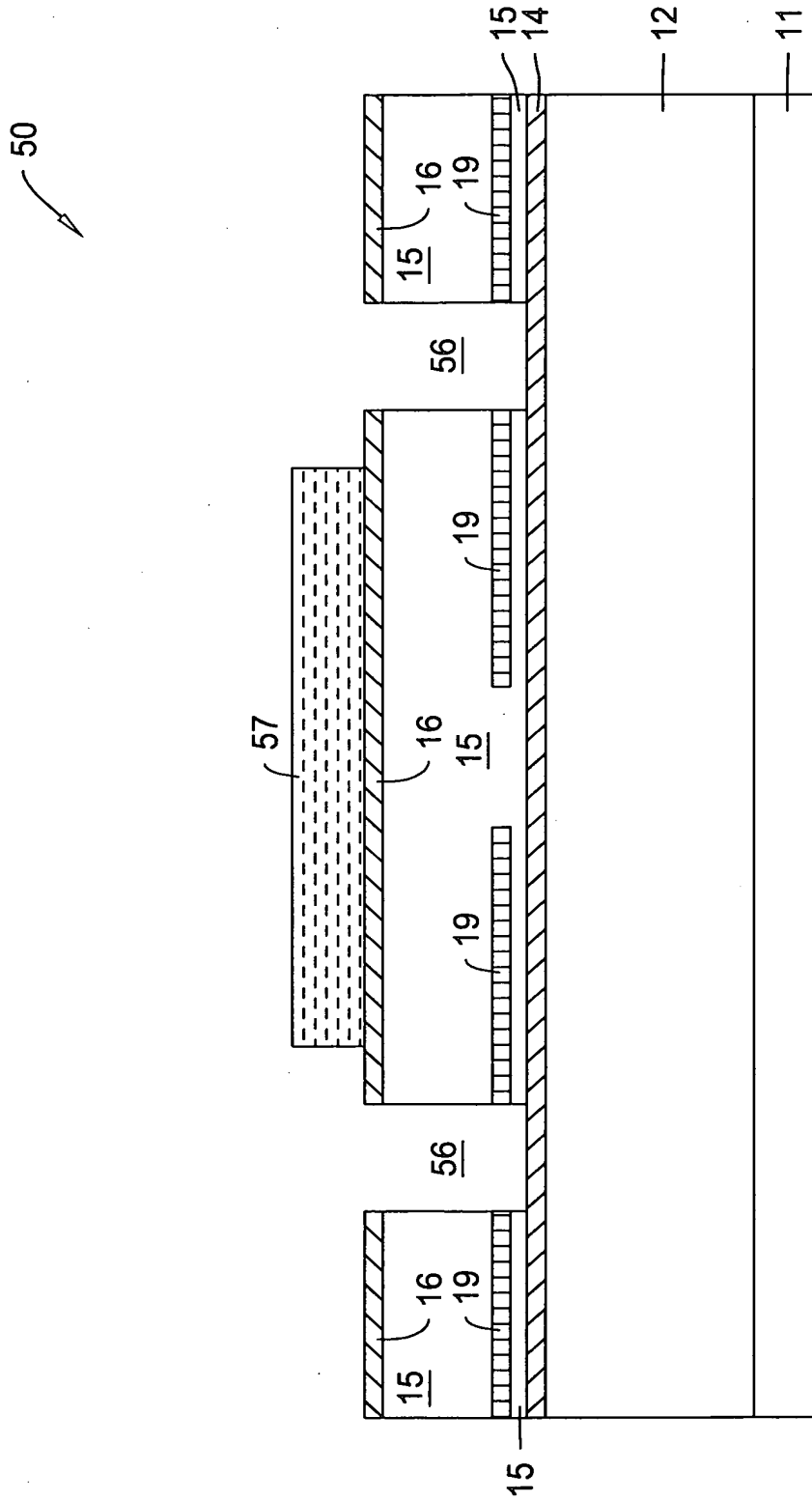
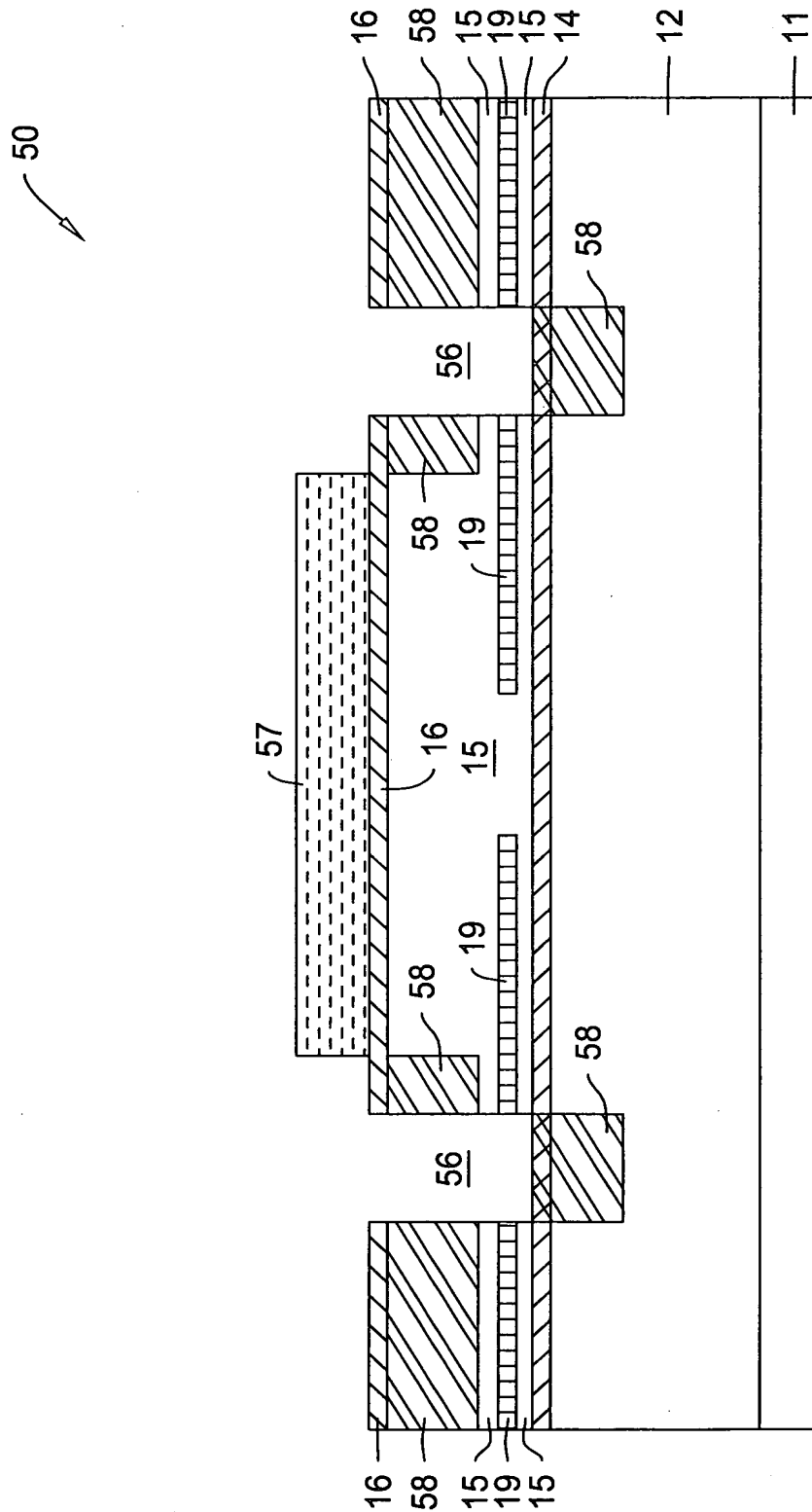


Figure 60



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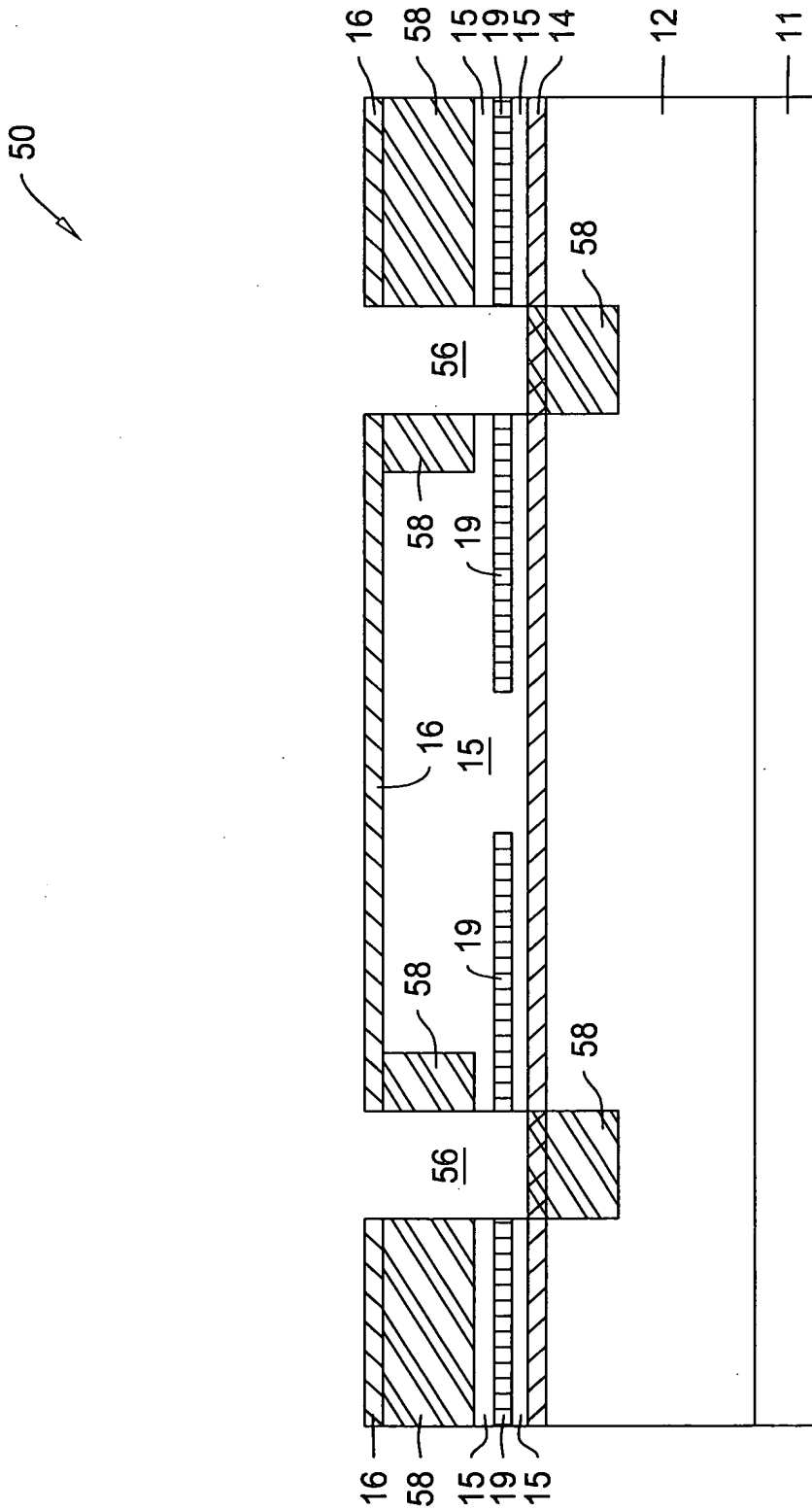


Figure 62

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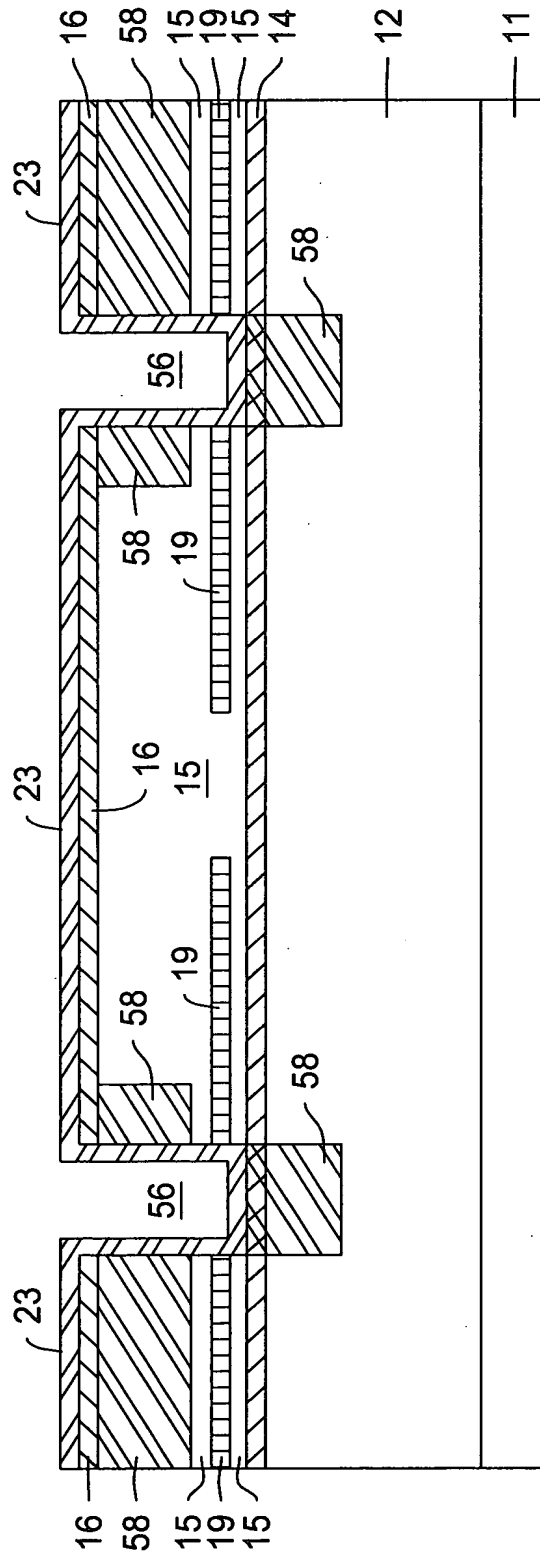
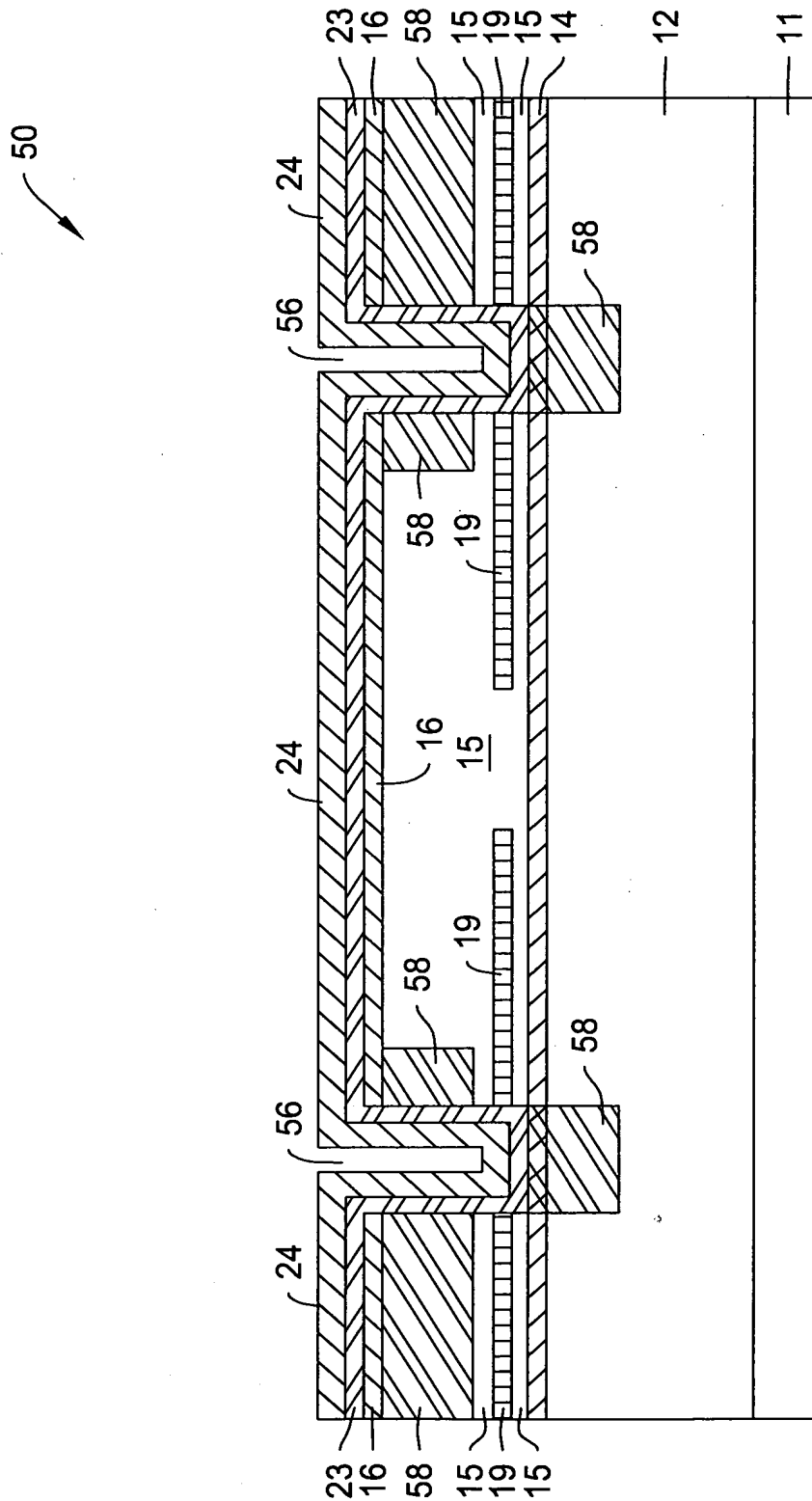


Figure 63





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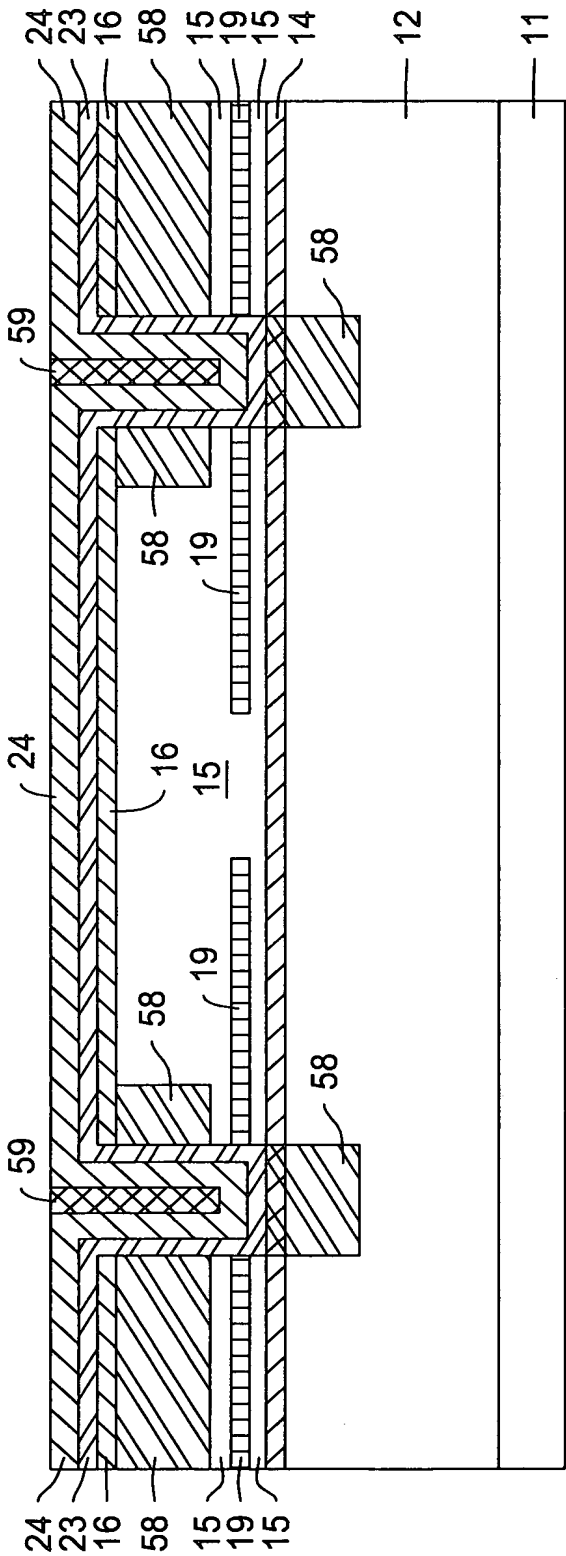


Figure 66

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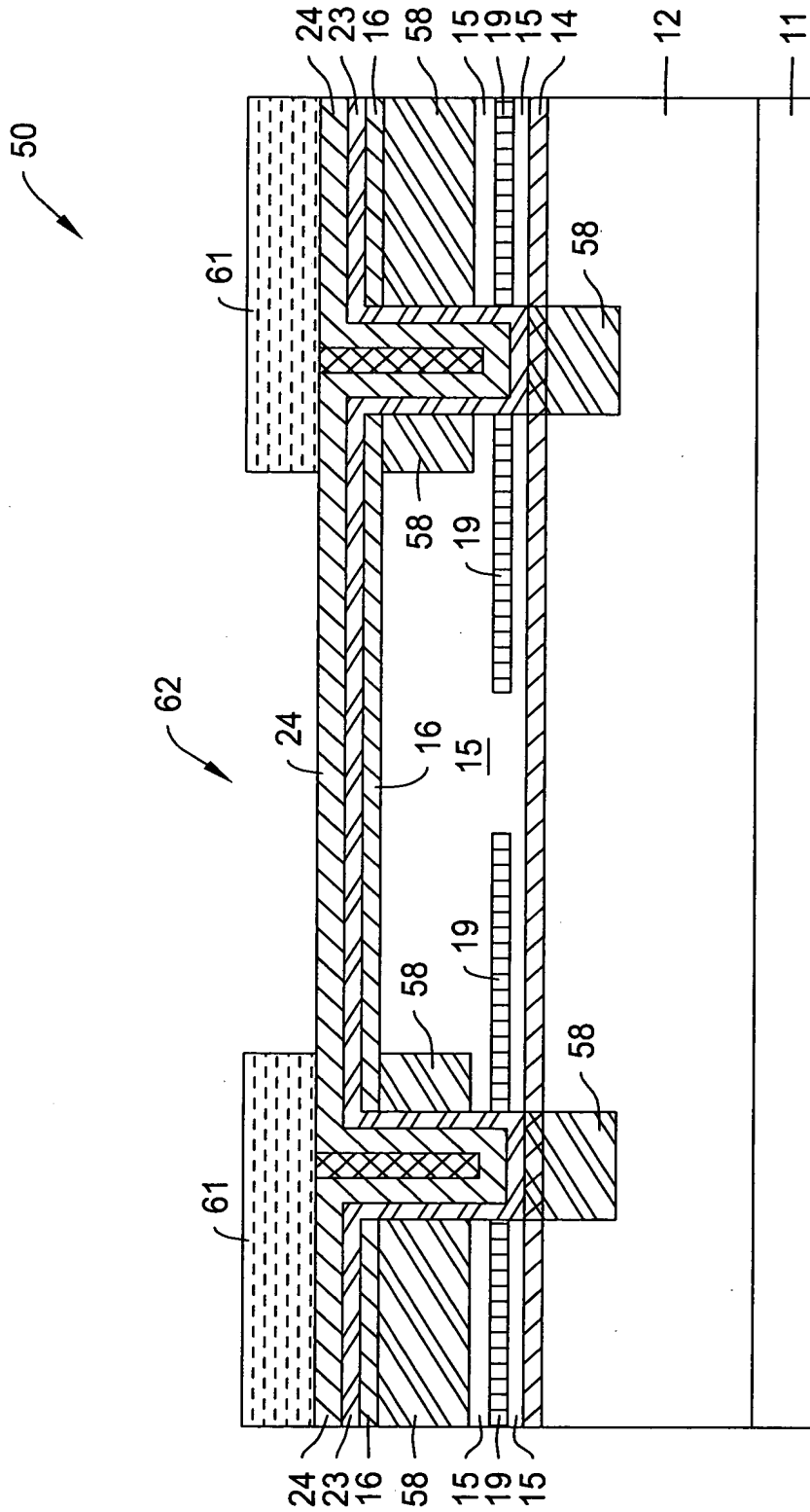
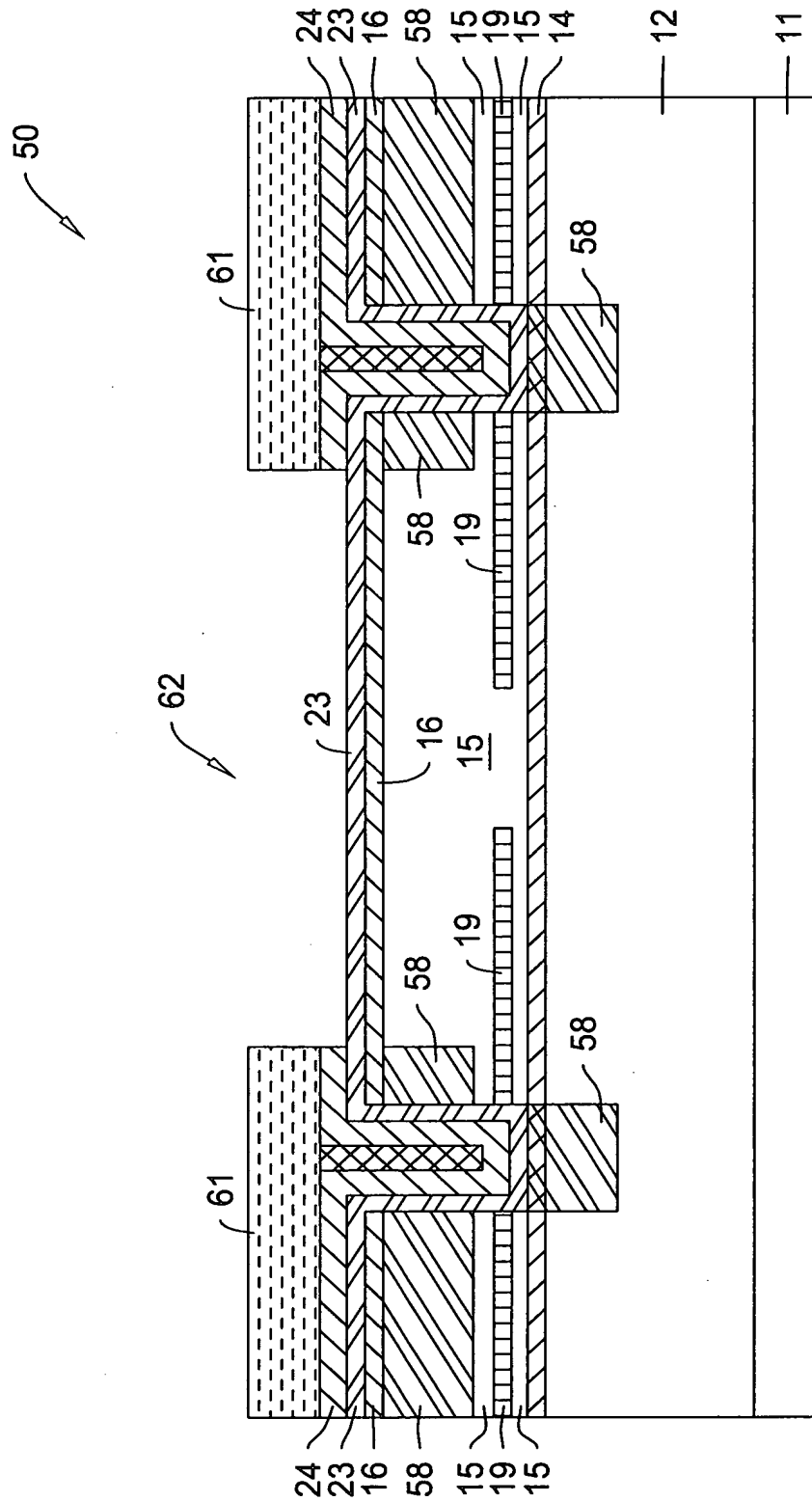


Figure 67



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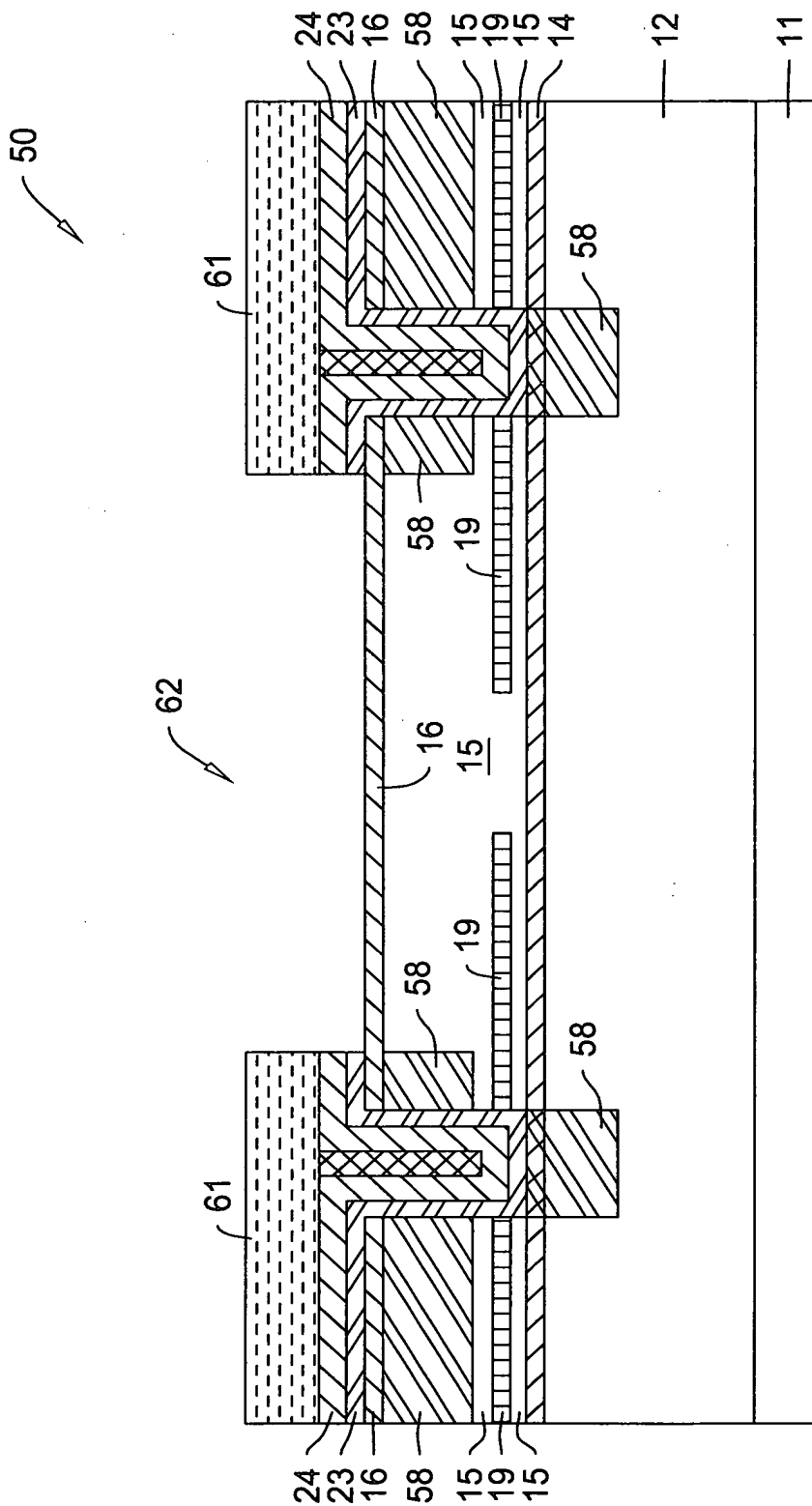


Figure 69

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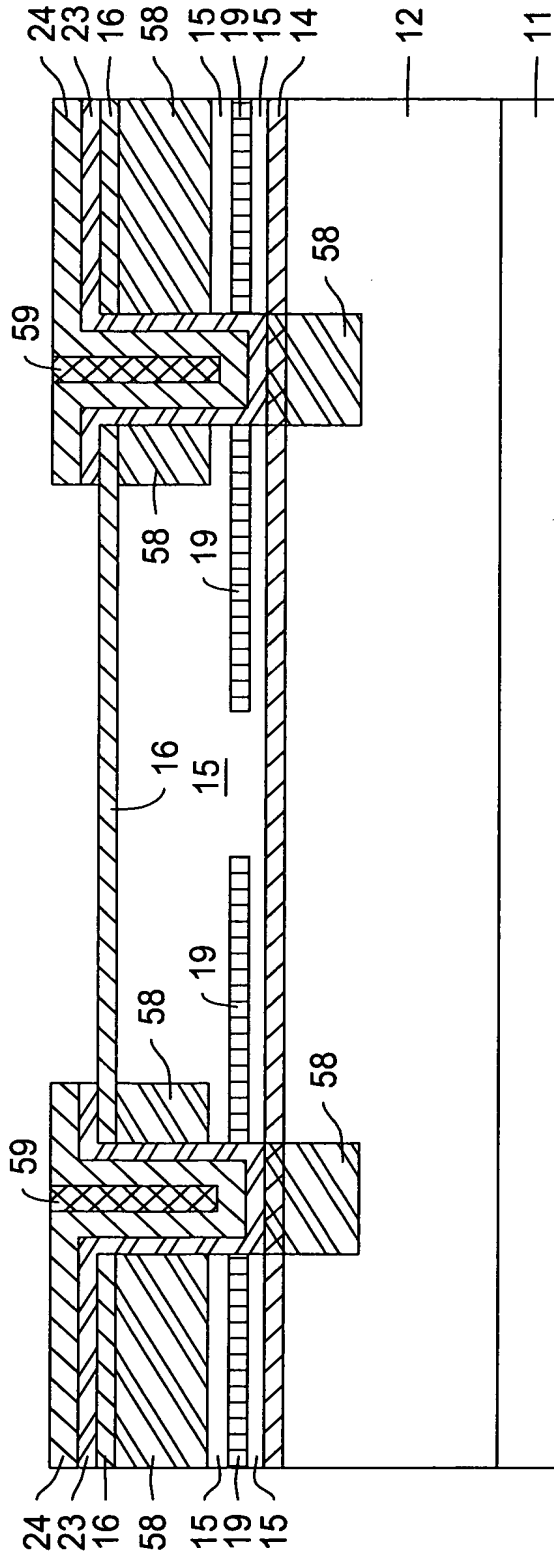


Figure 70

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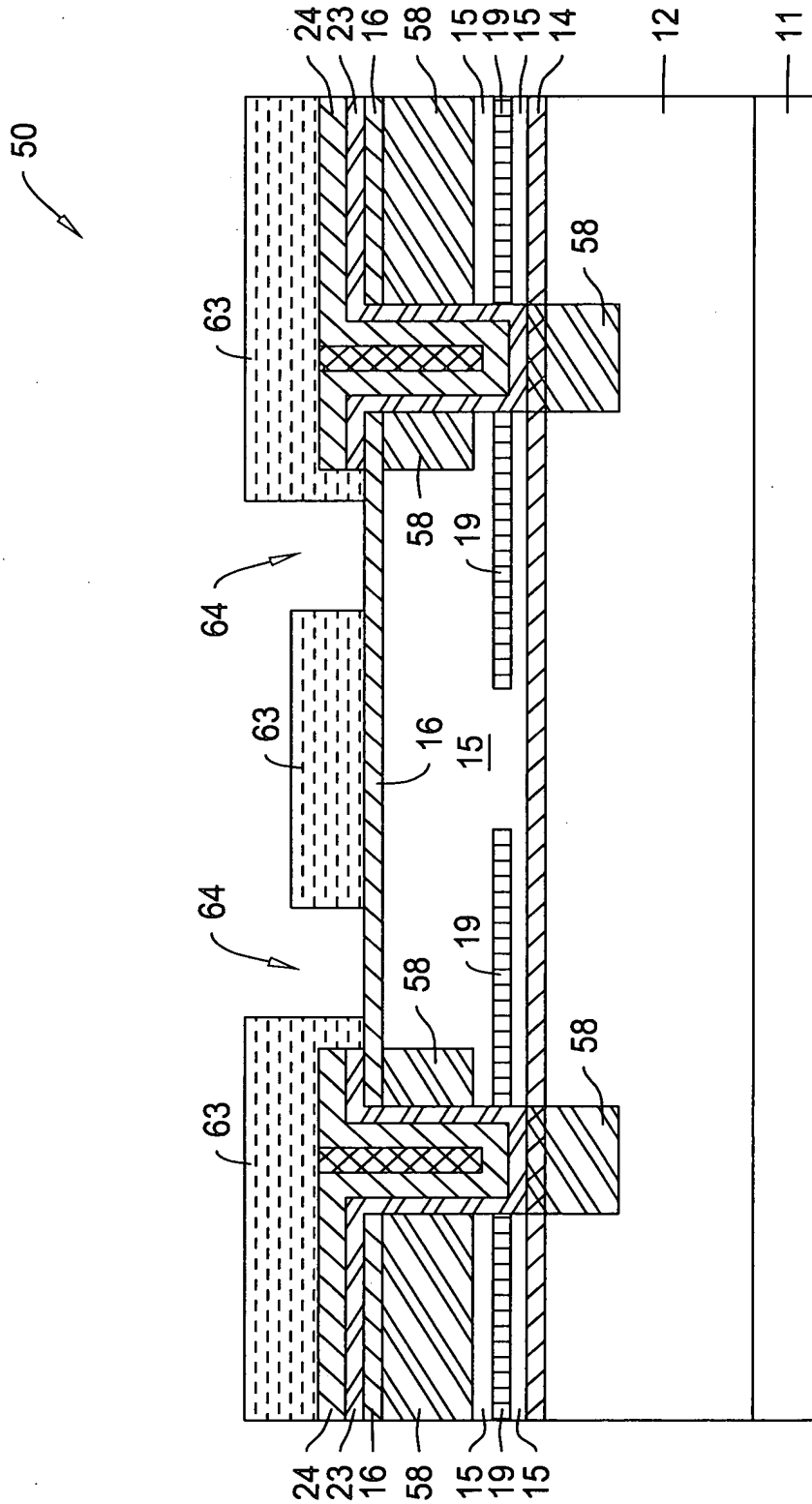


Figure 71

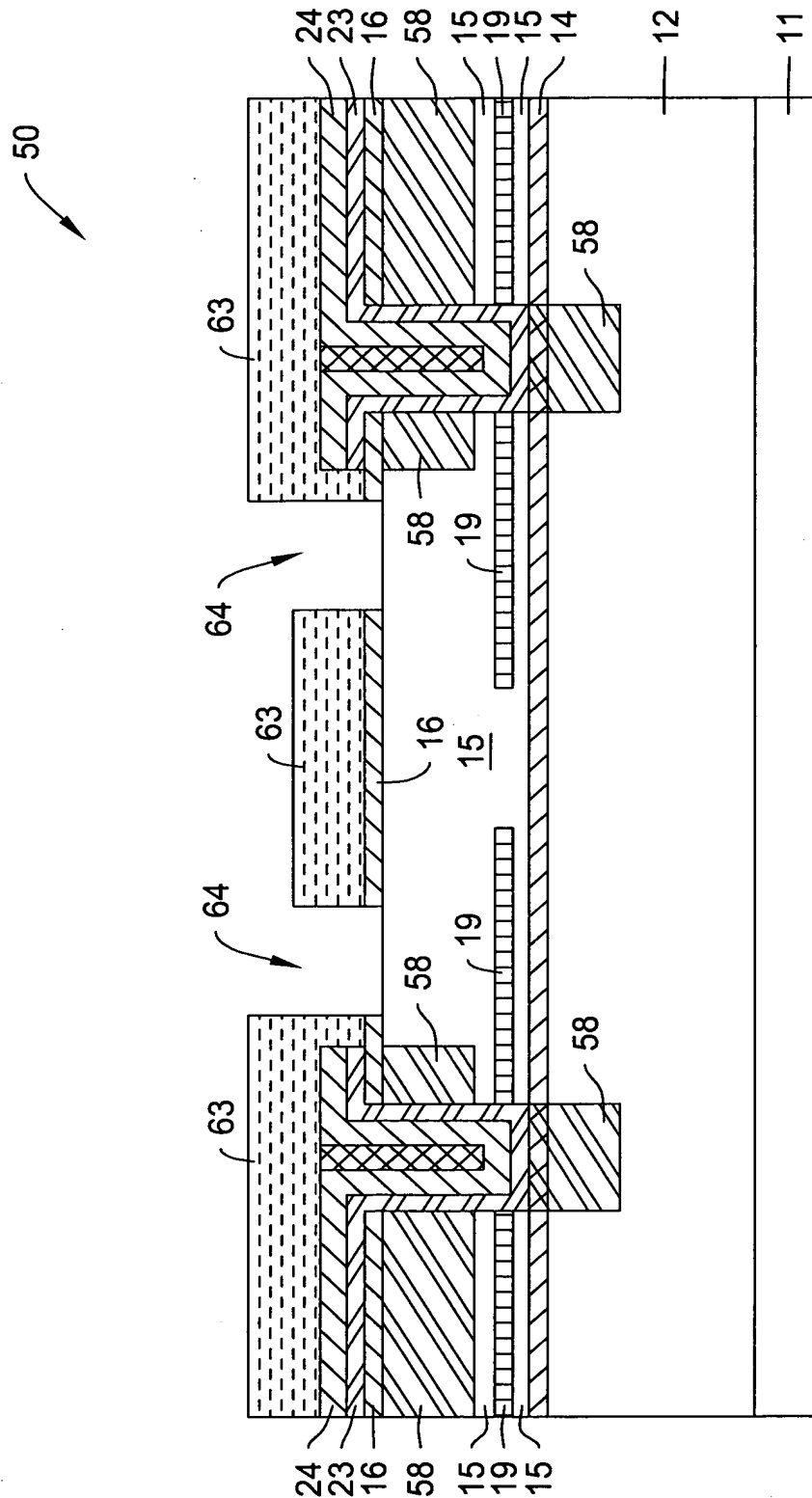
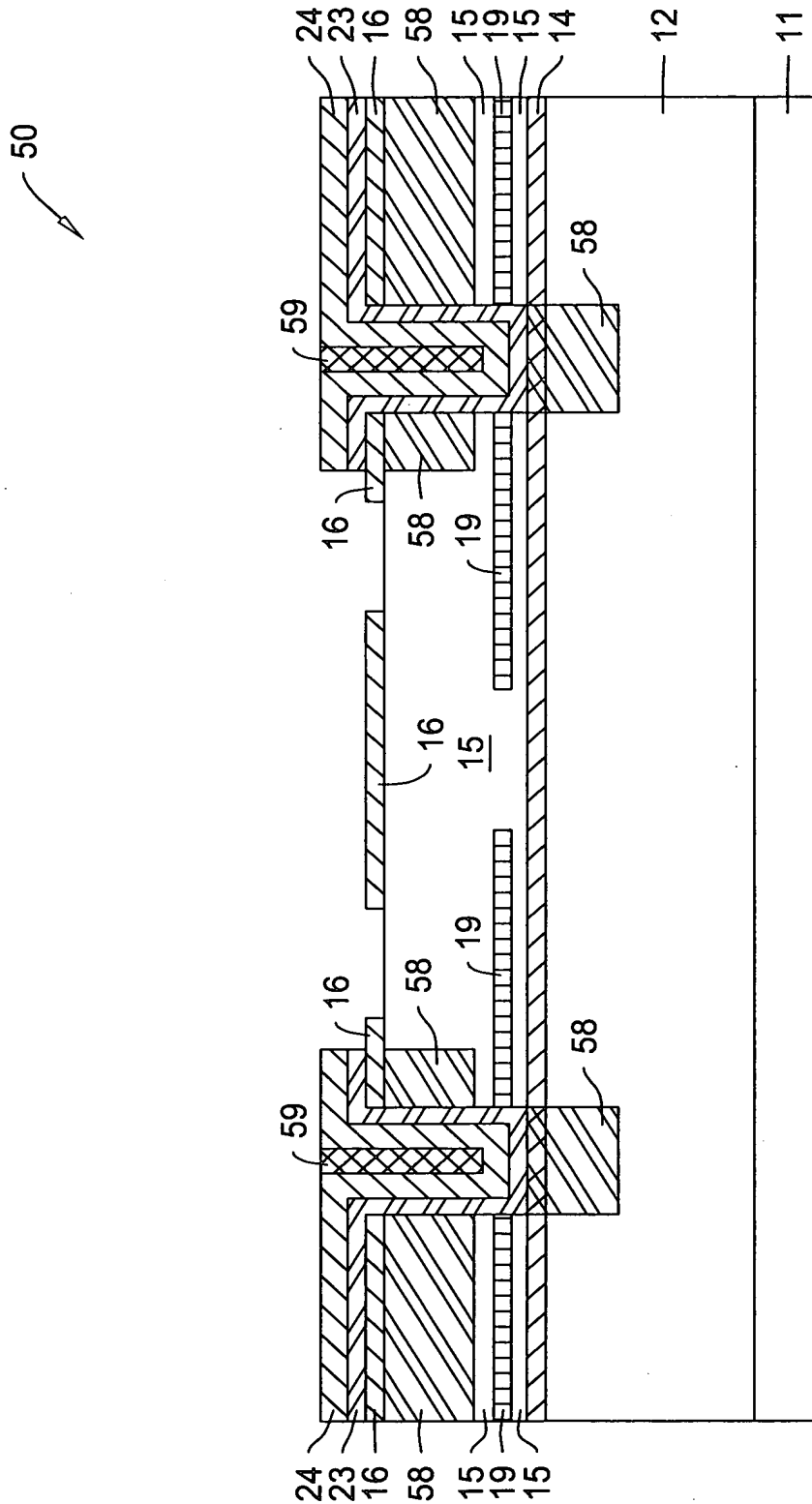


Figure 72



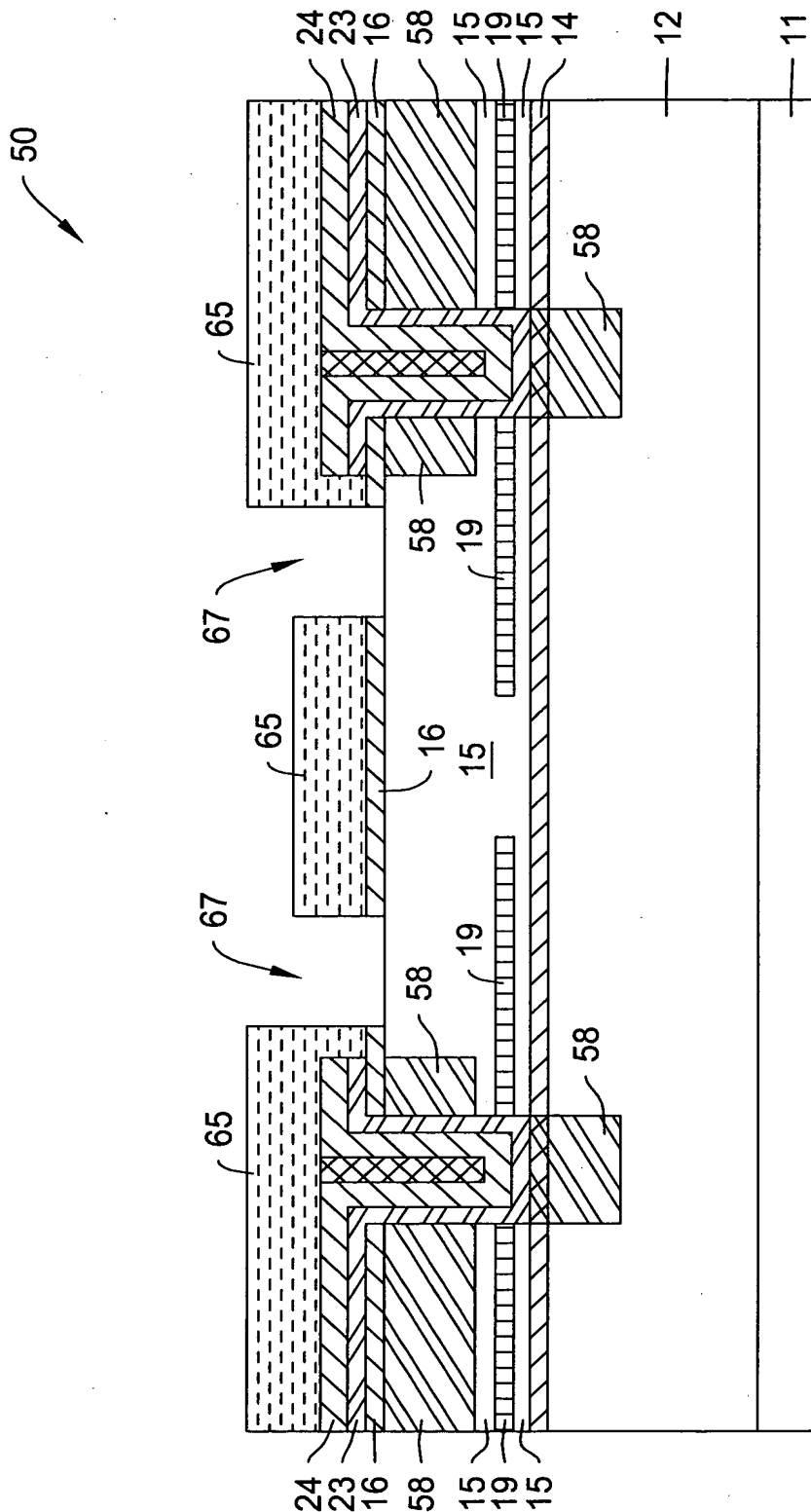
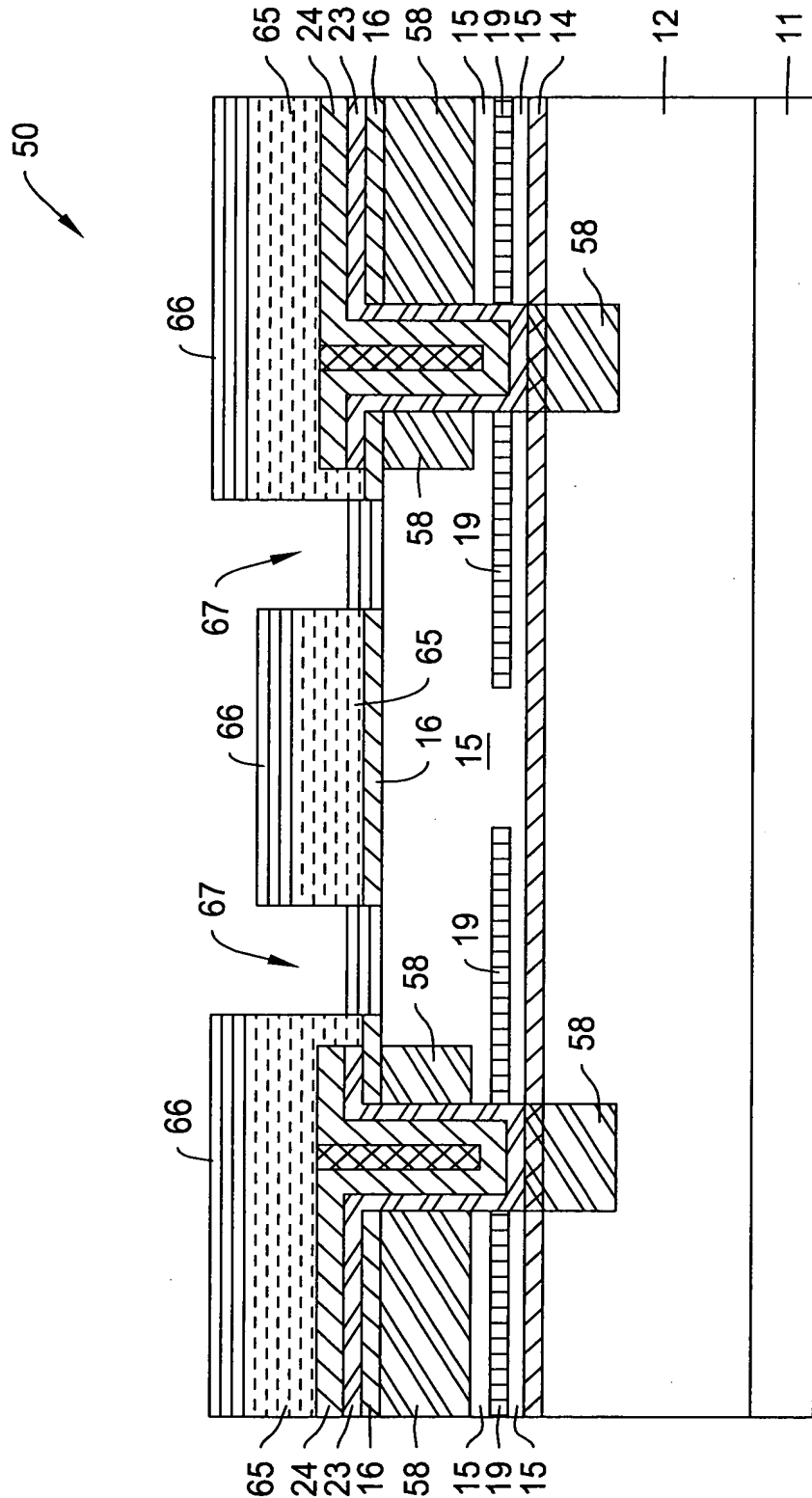


Figure 74



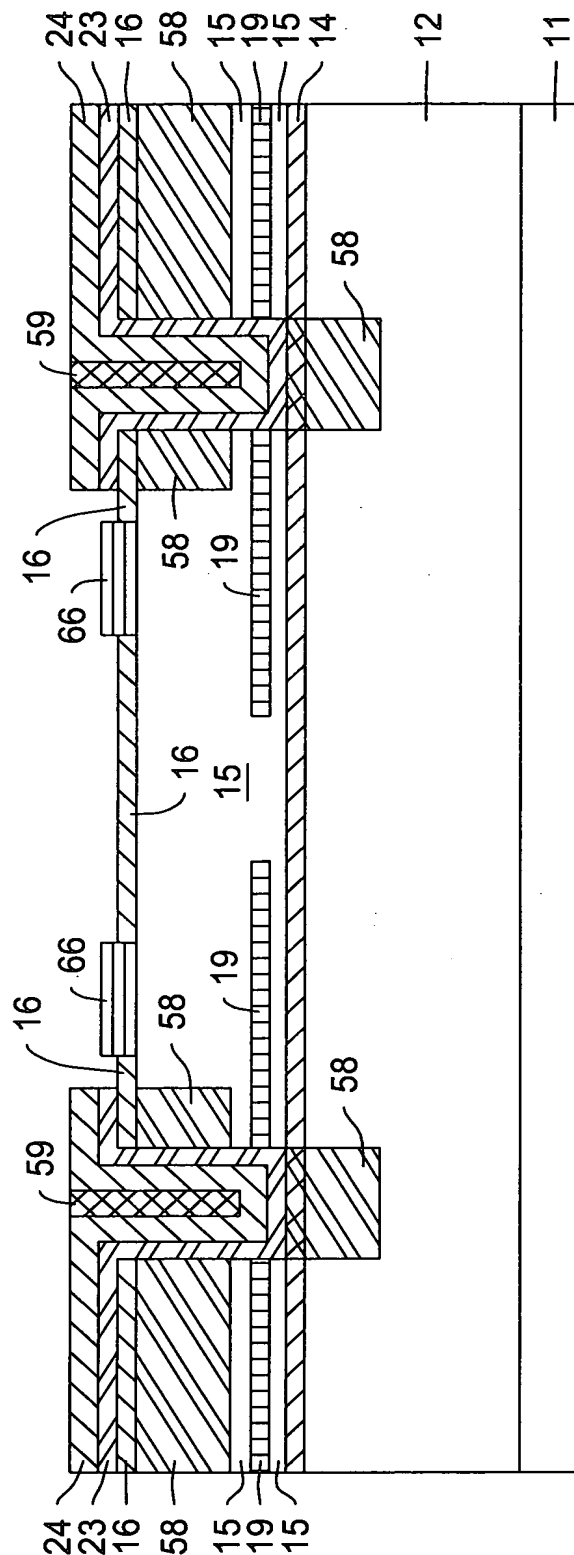


Figure 76

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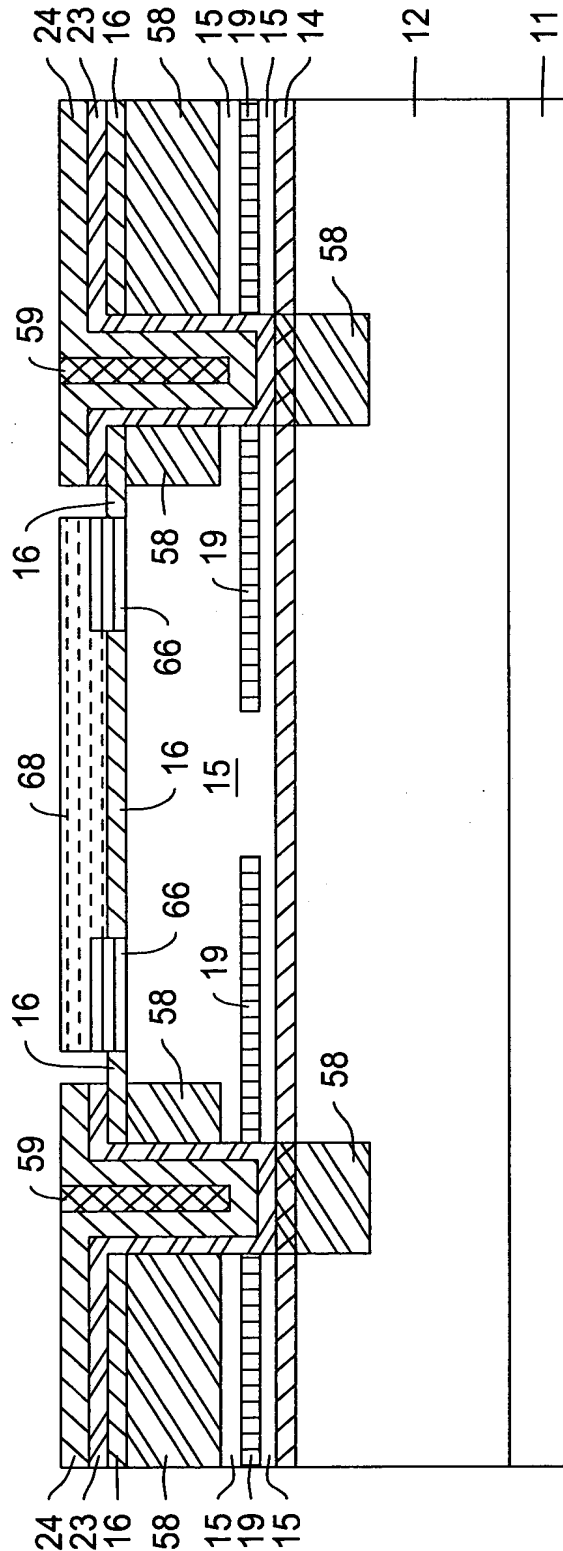


Figure 77

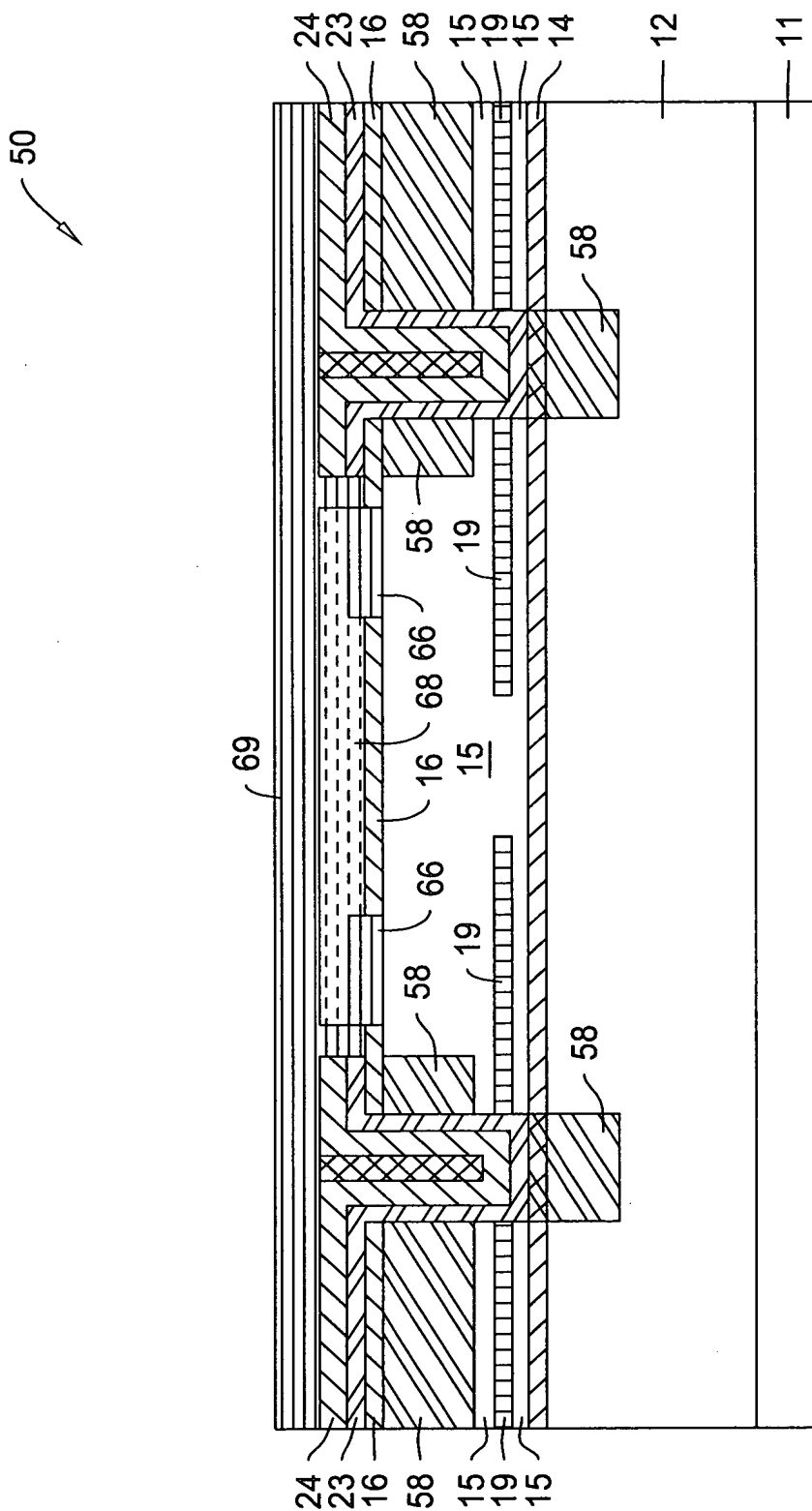


Figure 78

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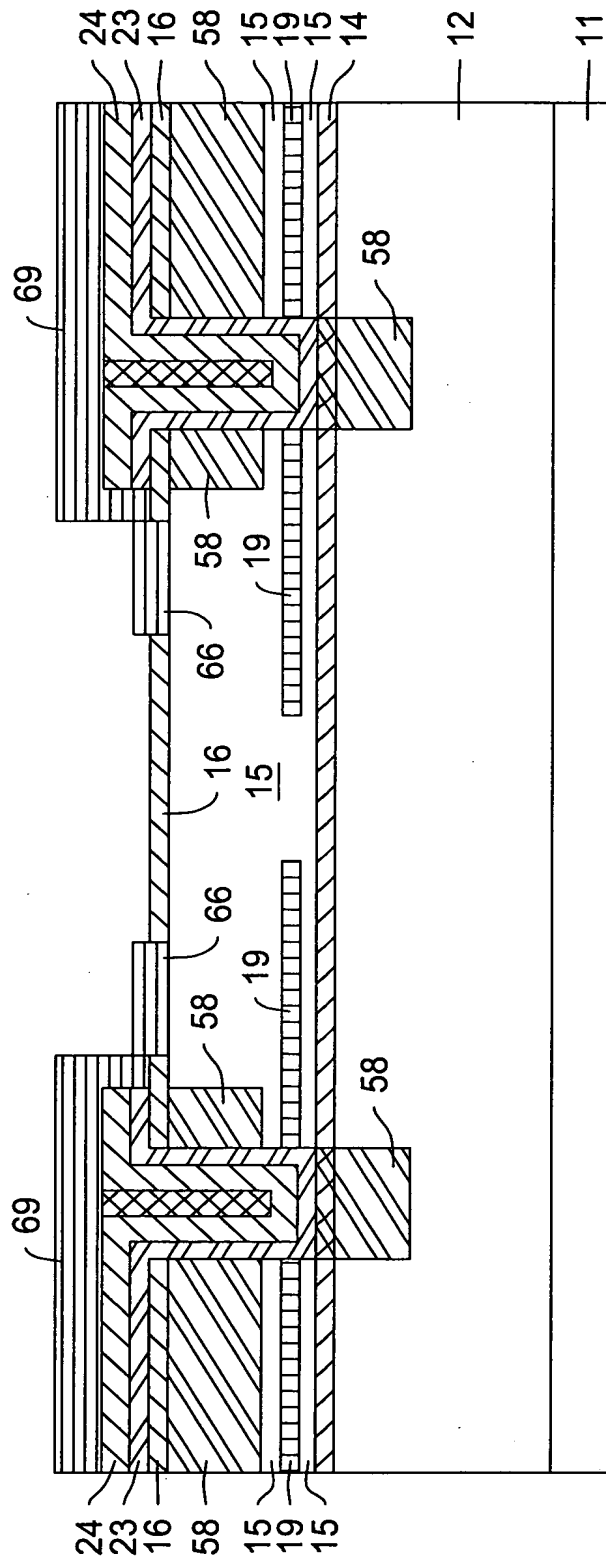


Figure 79

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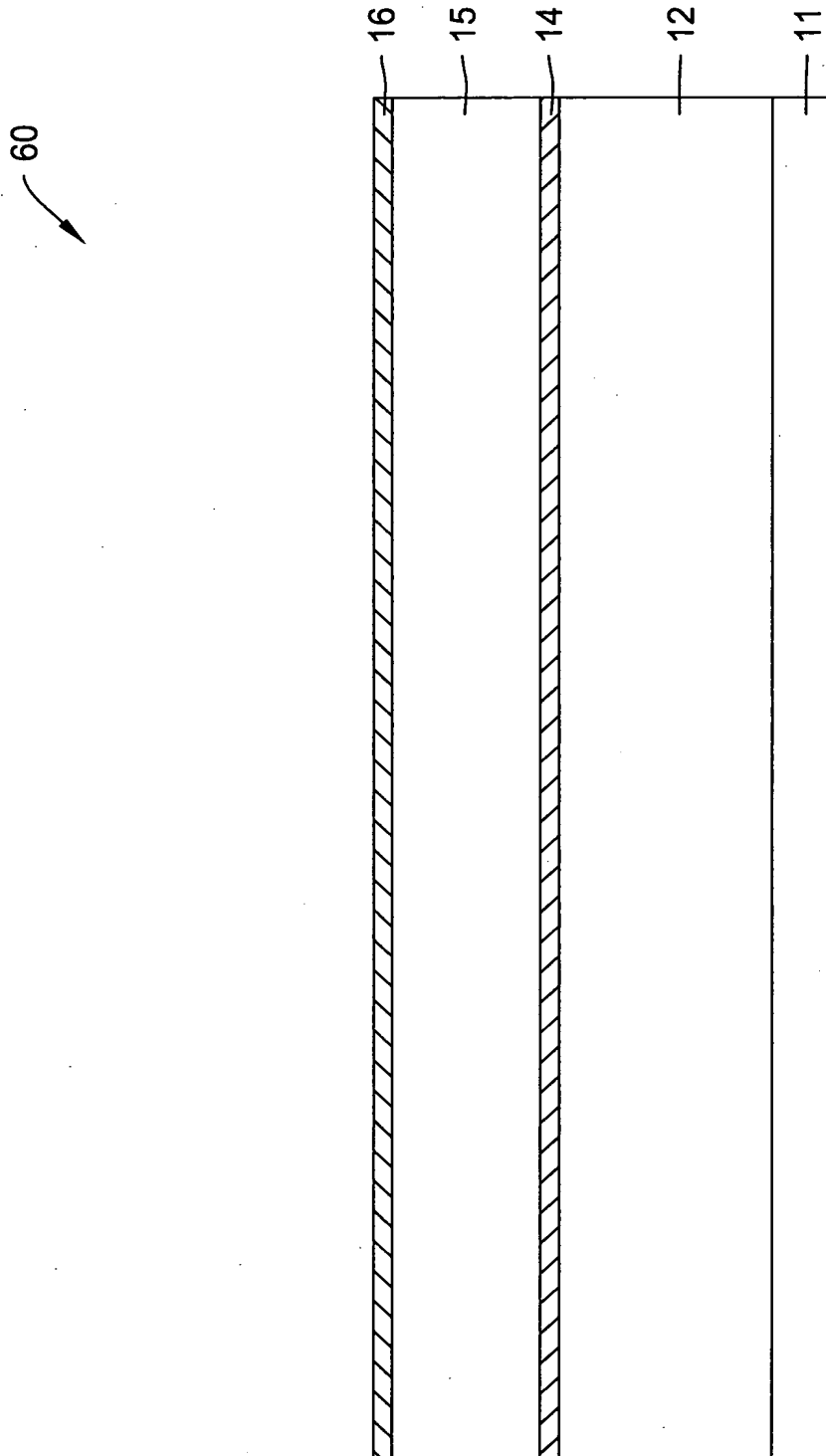


Figure 81

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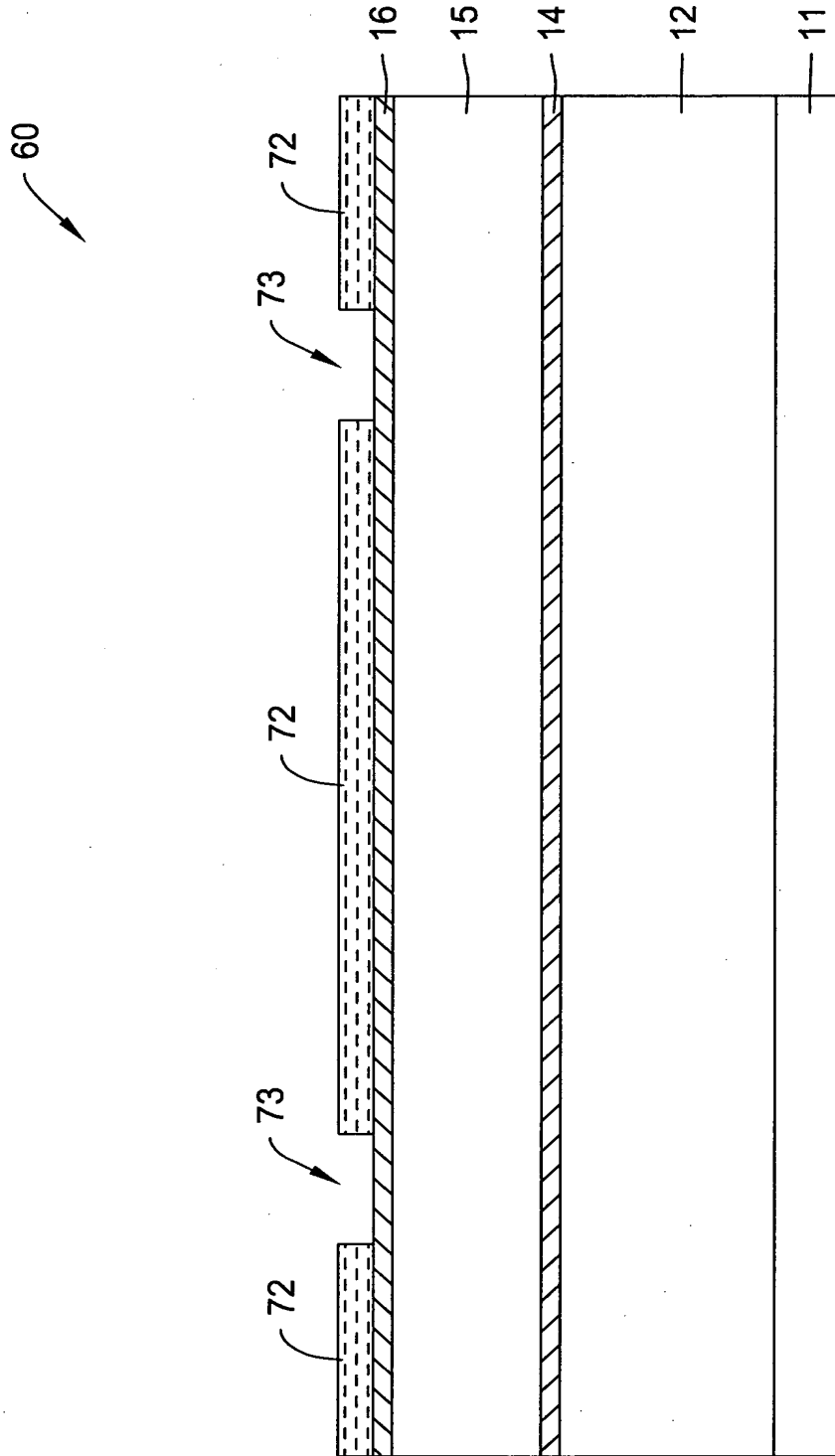


Figure 82

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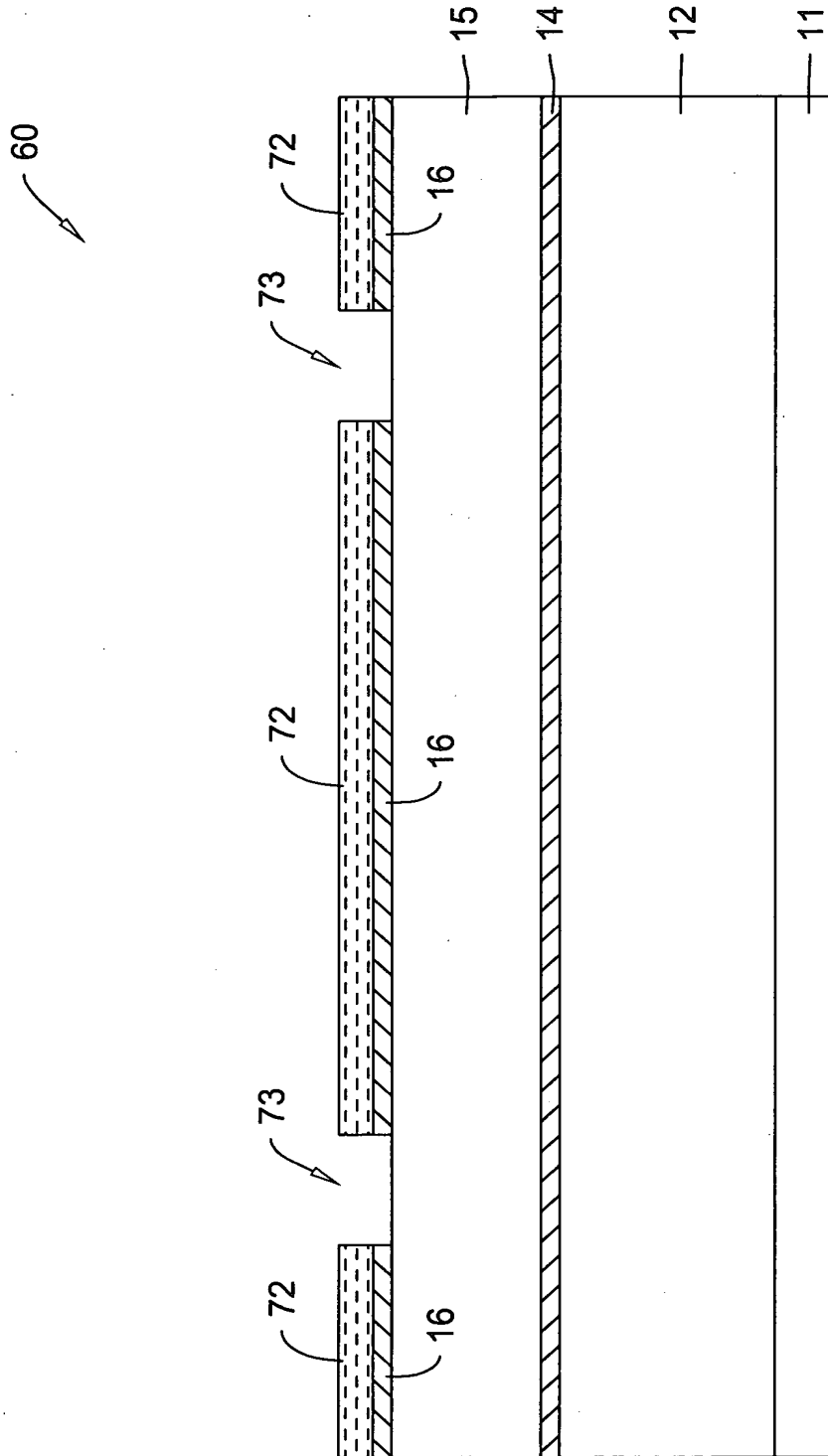


Figure 83

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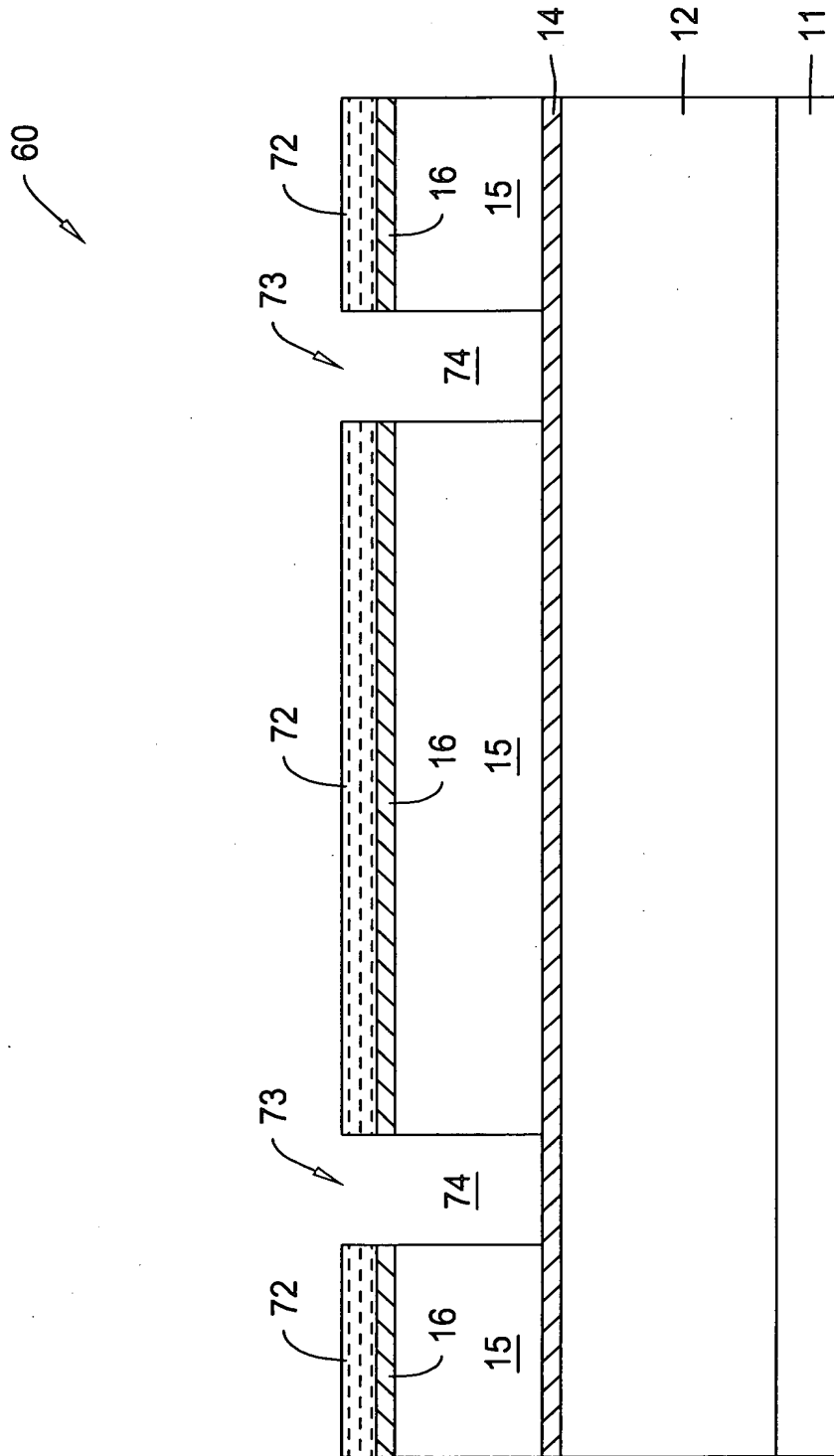


Figure 84

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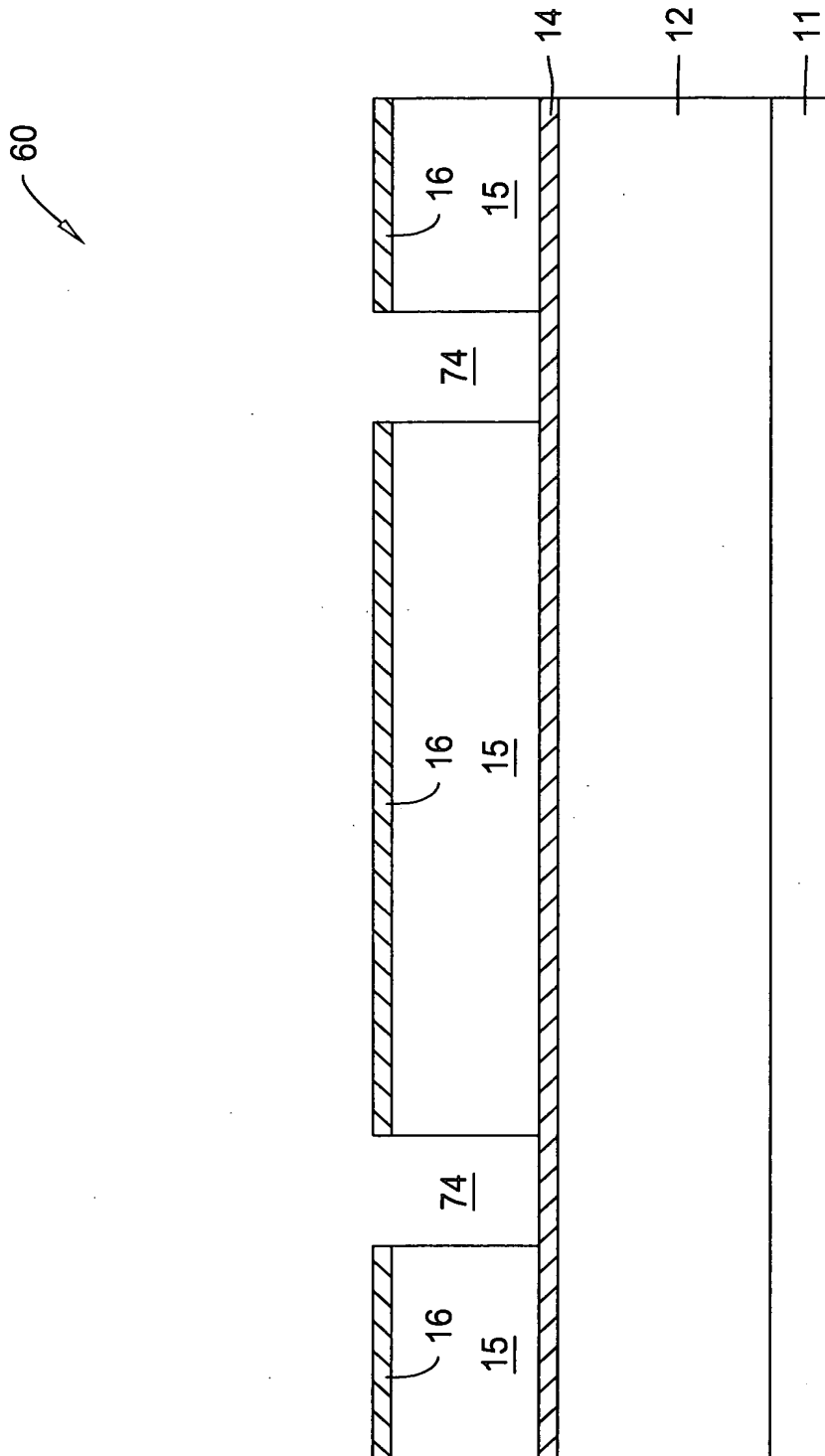


Figure 85

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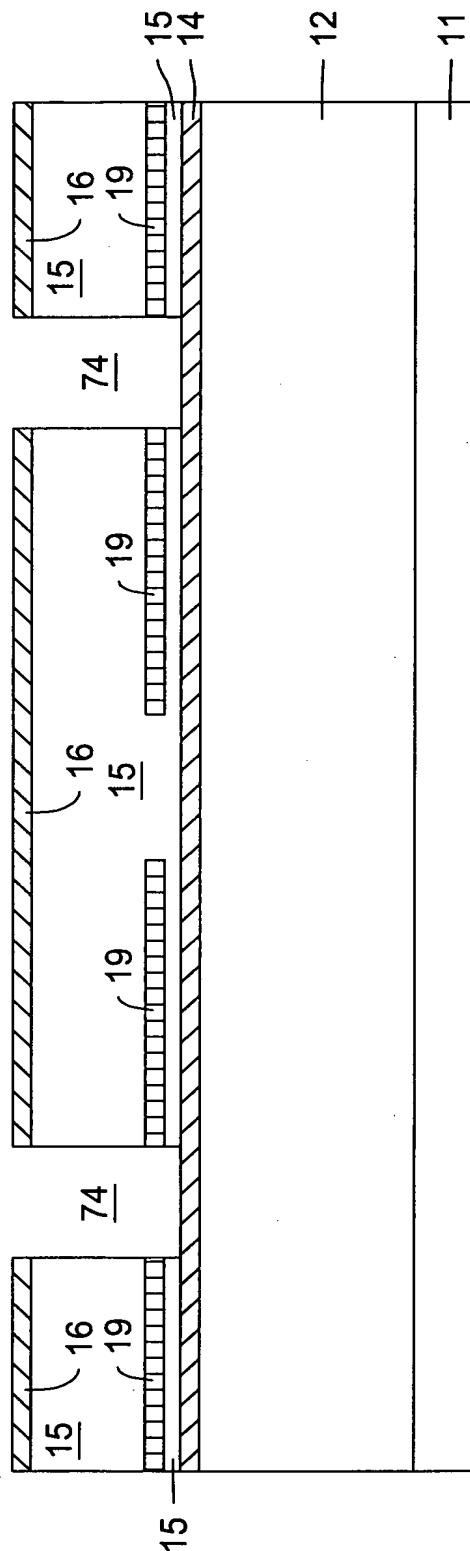


Figure 86

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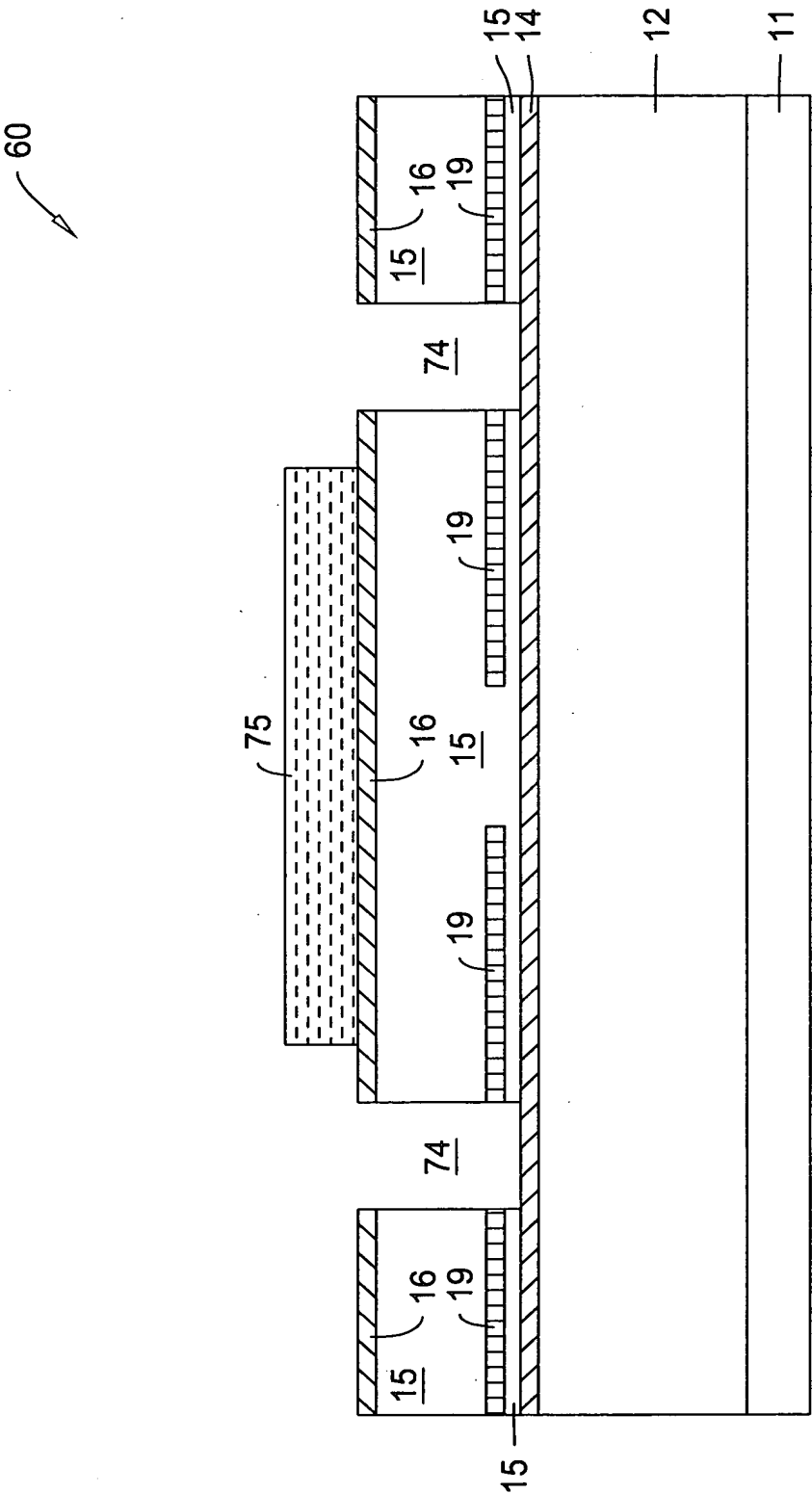
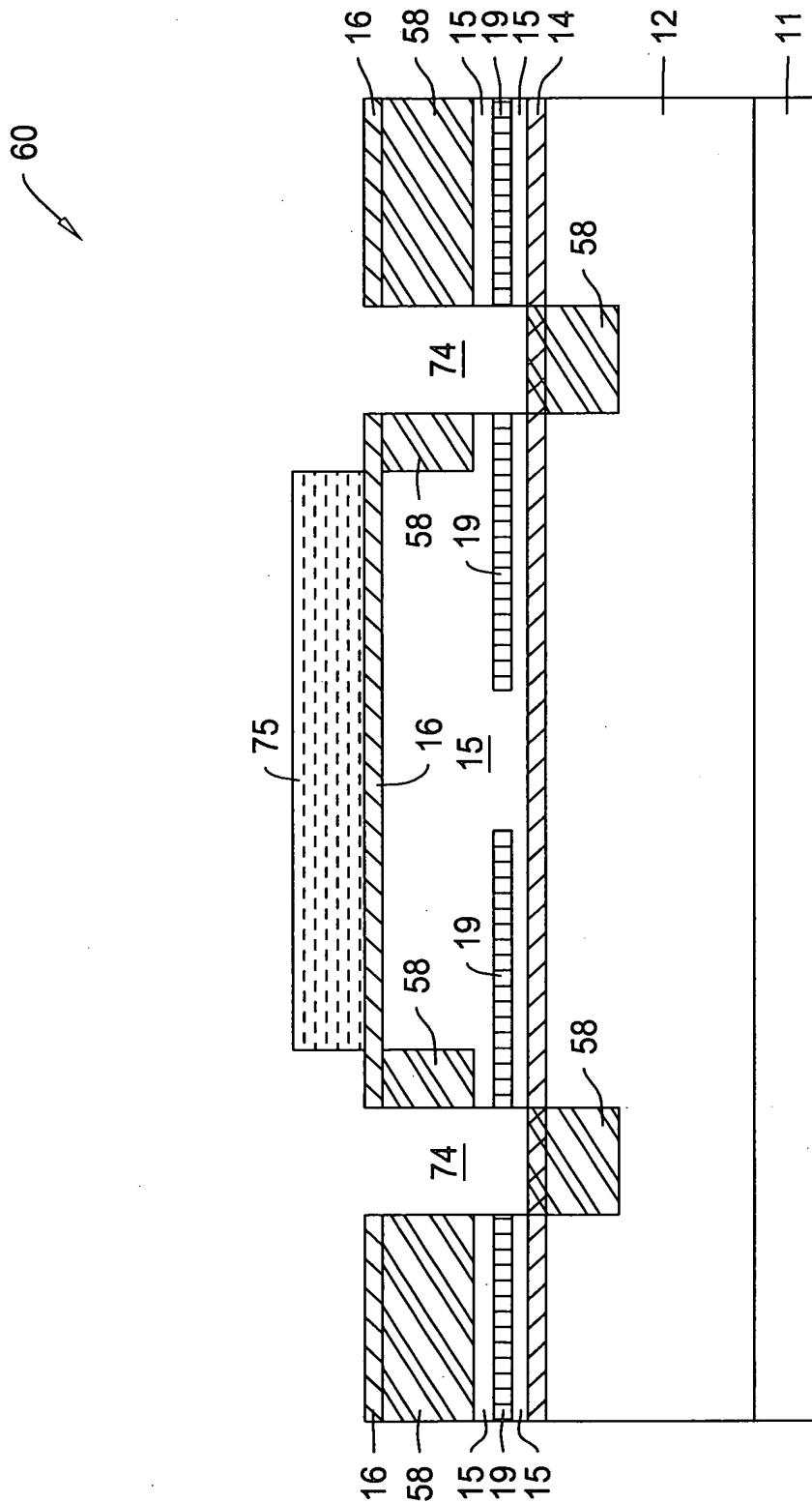
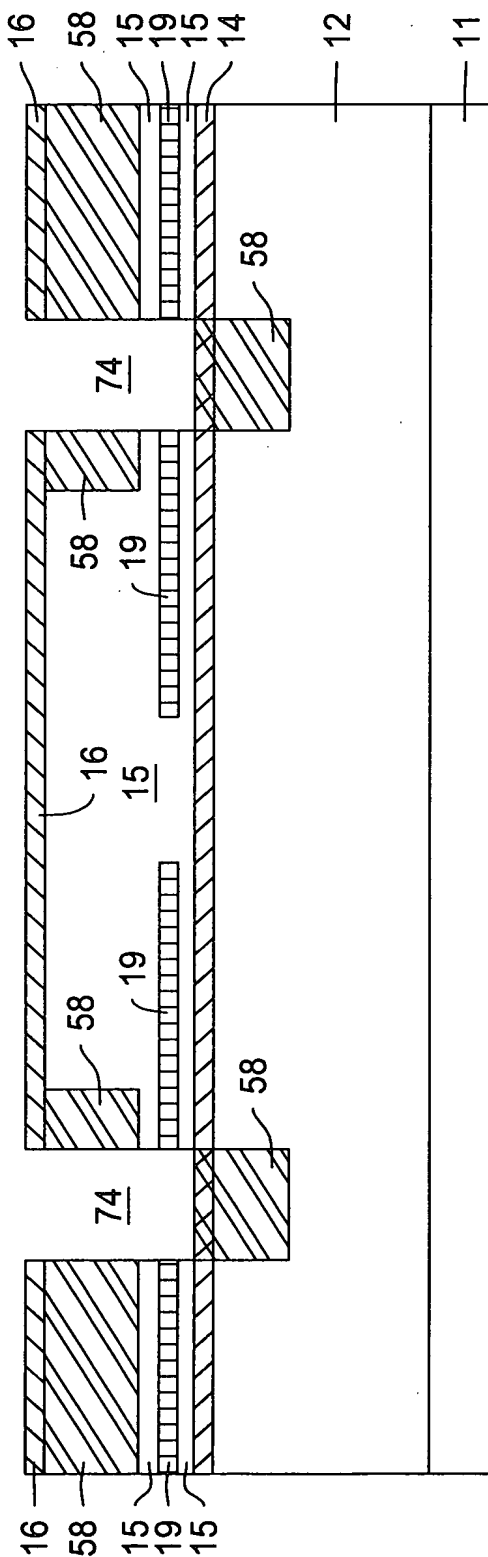


Figure 87





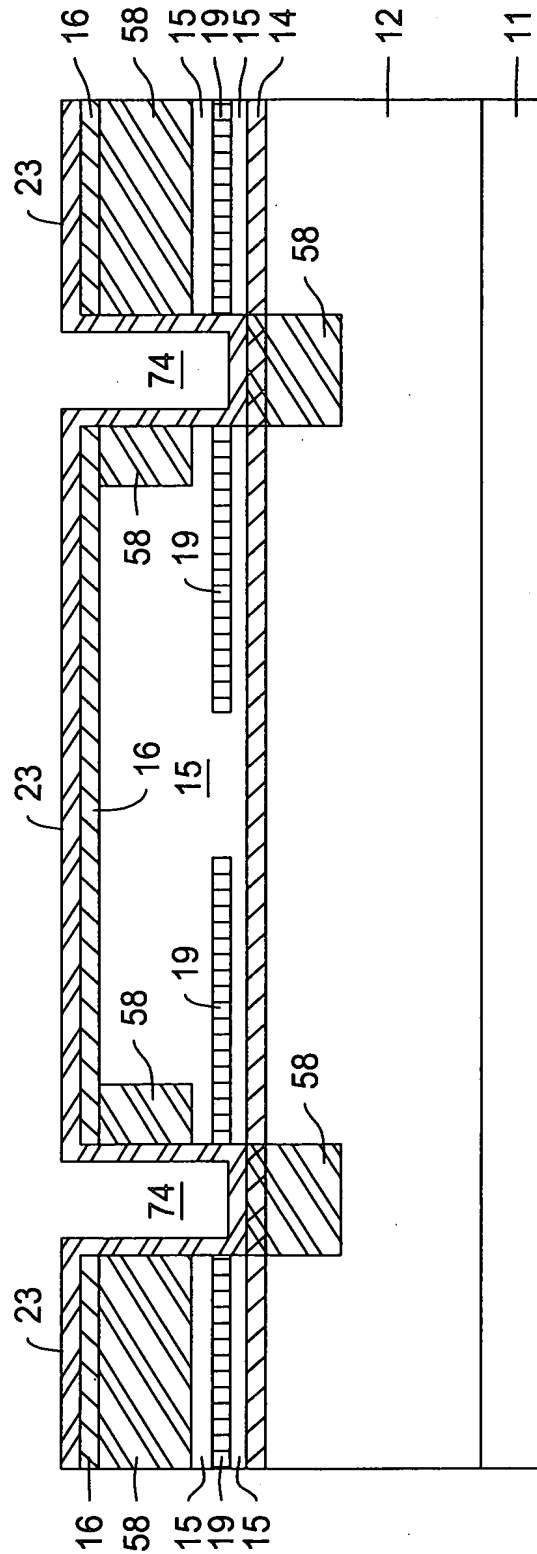


Figure 90

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60

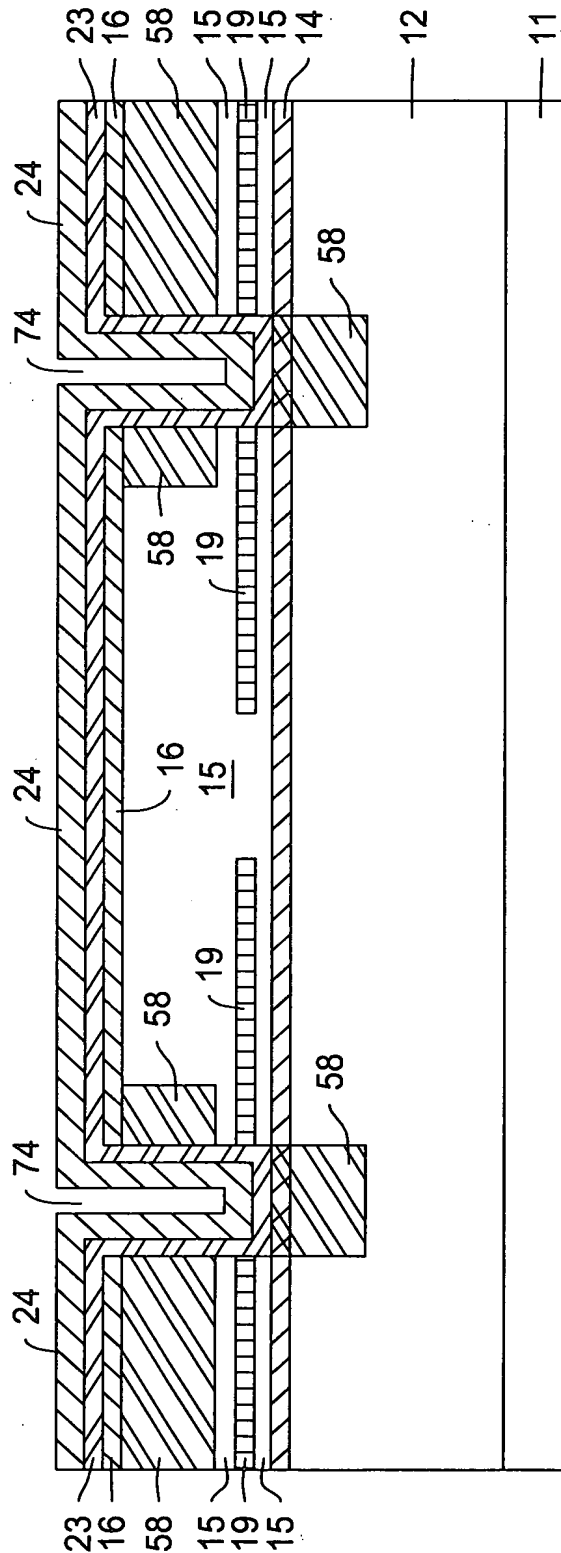


Figure 91

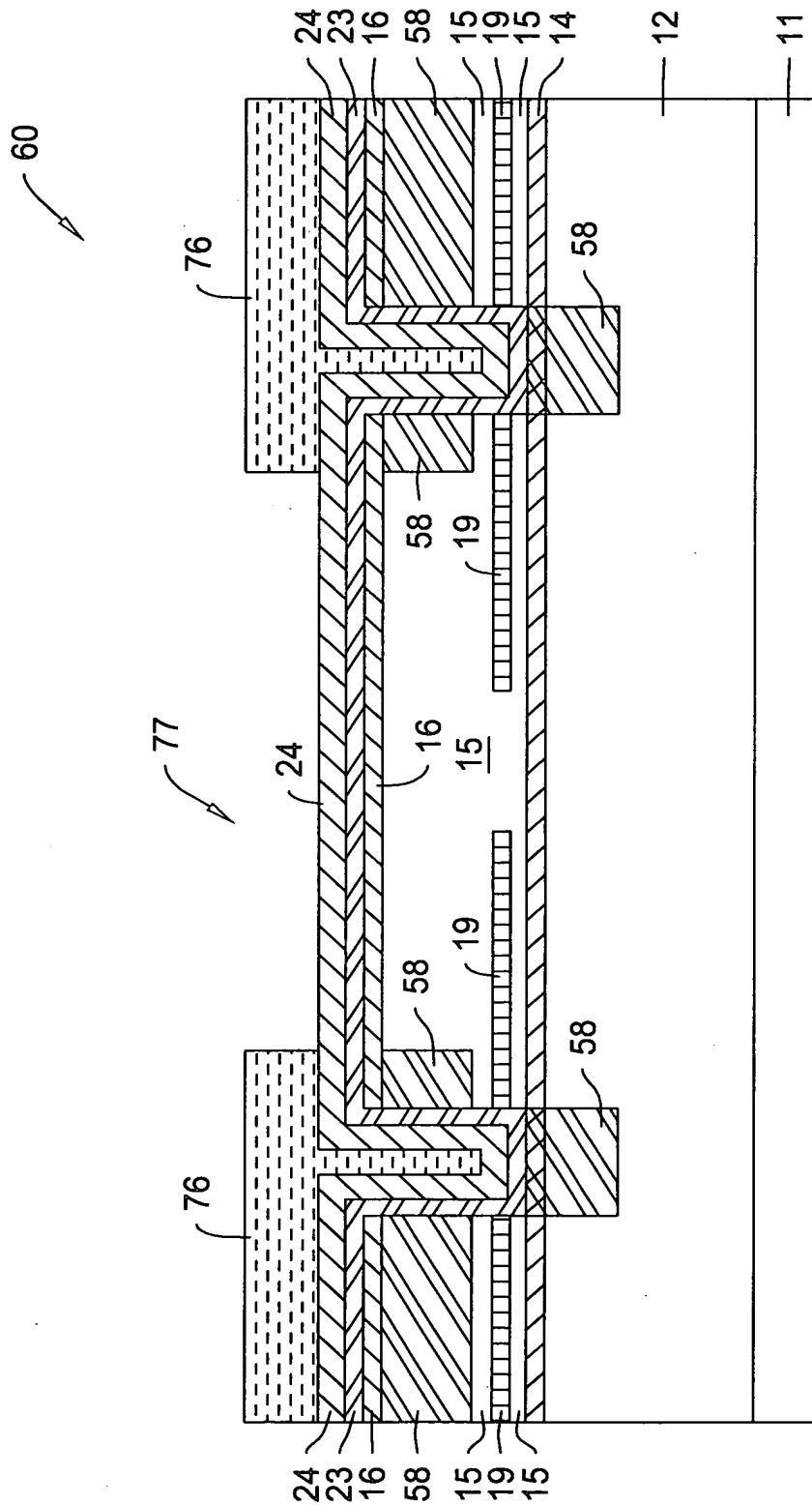


Figure 92

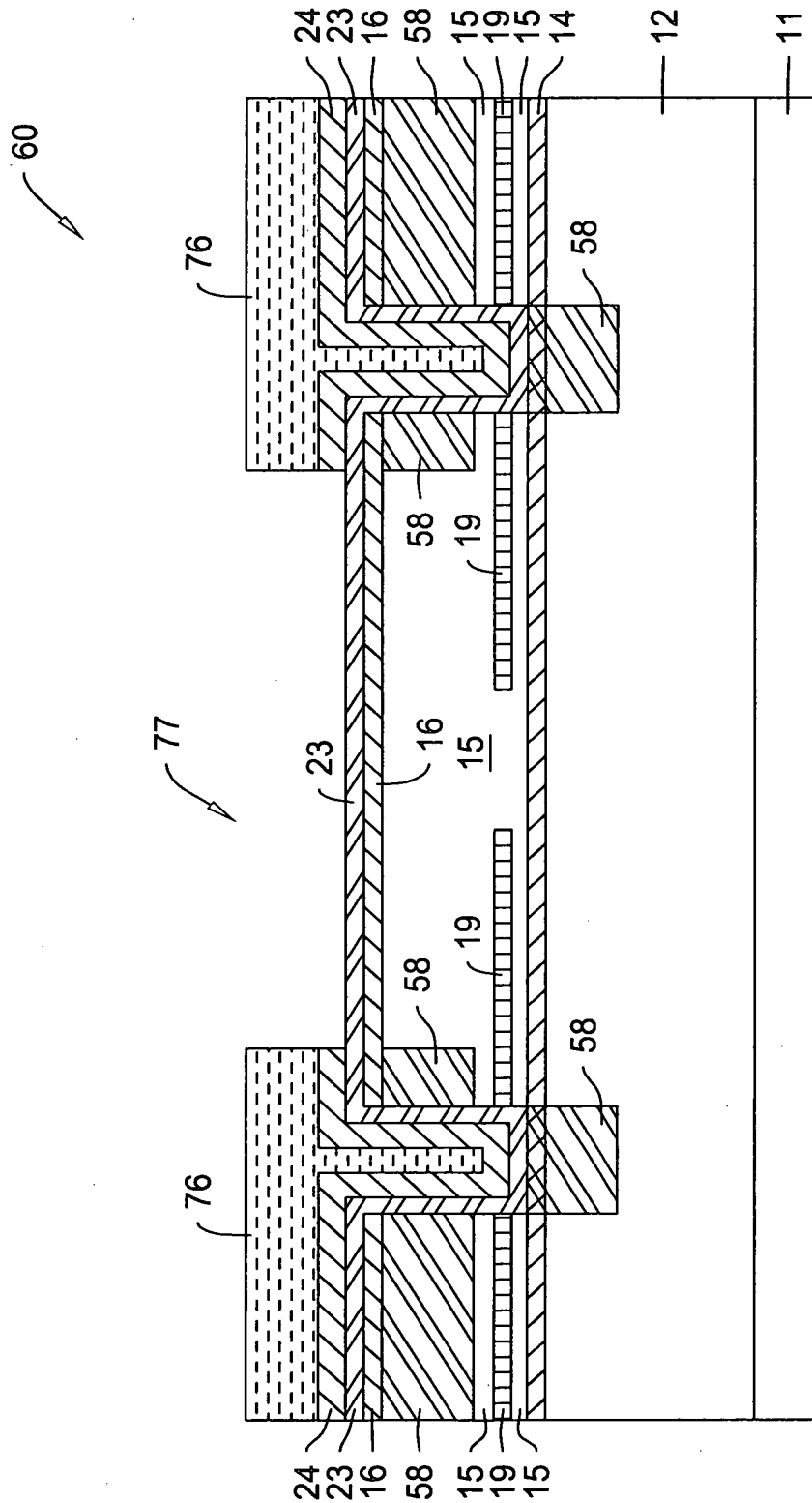


Figure 93

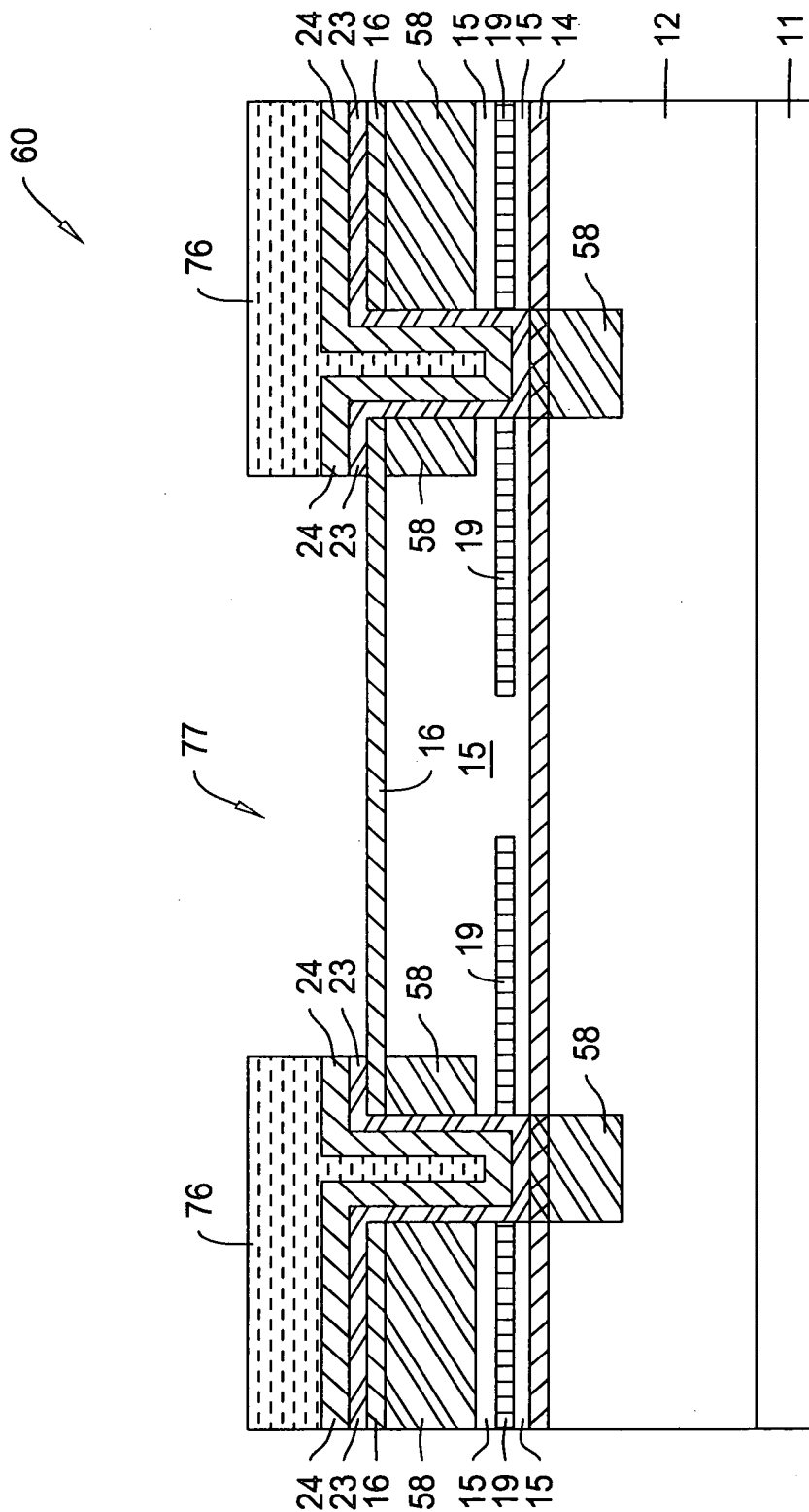
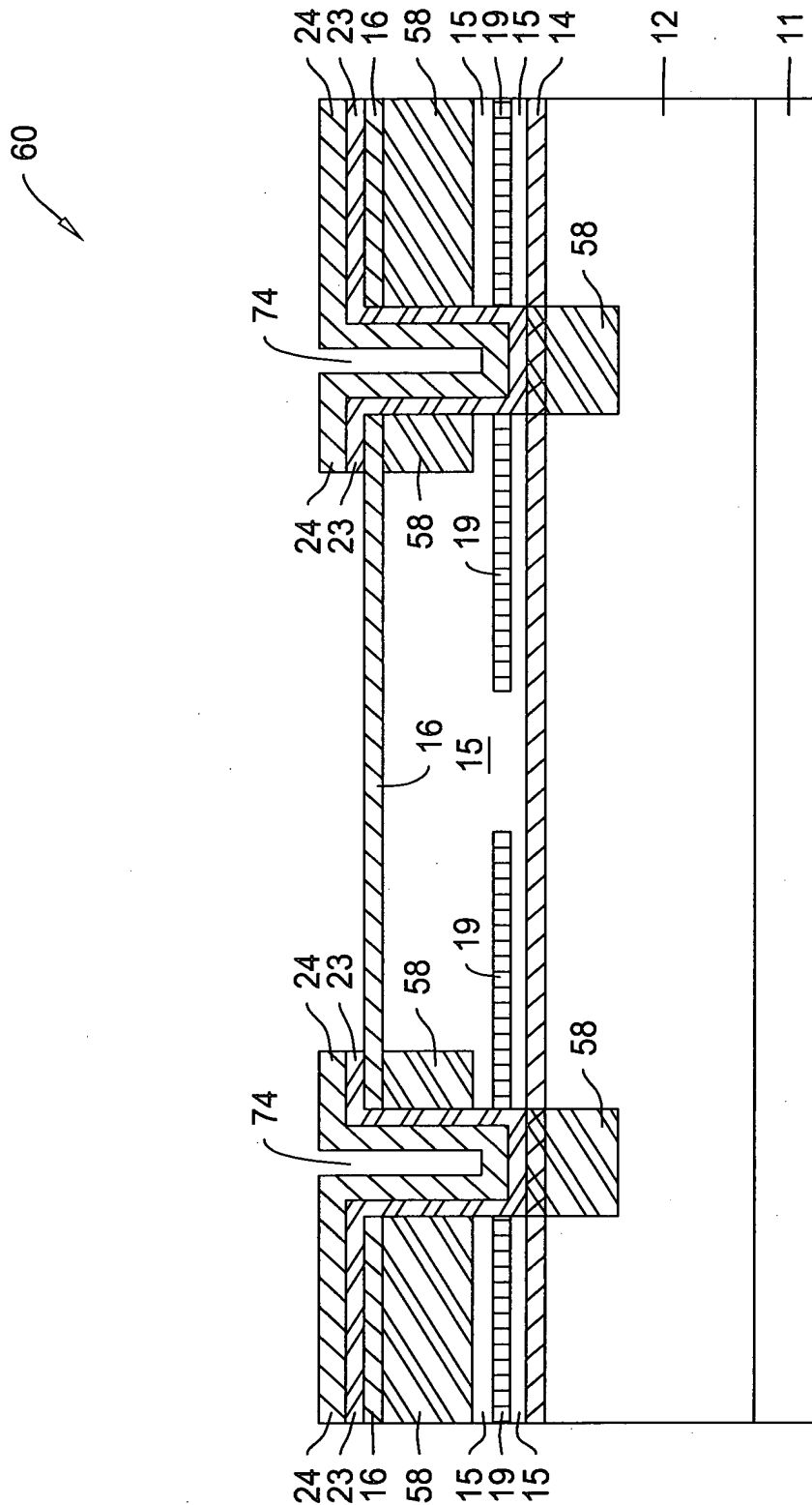


Figure 94



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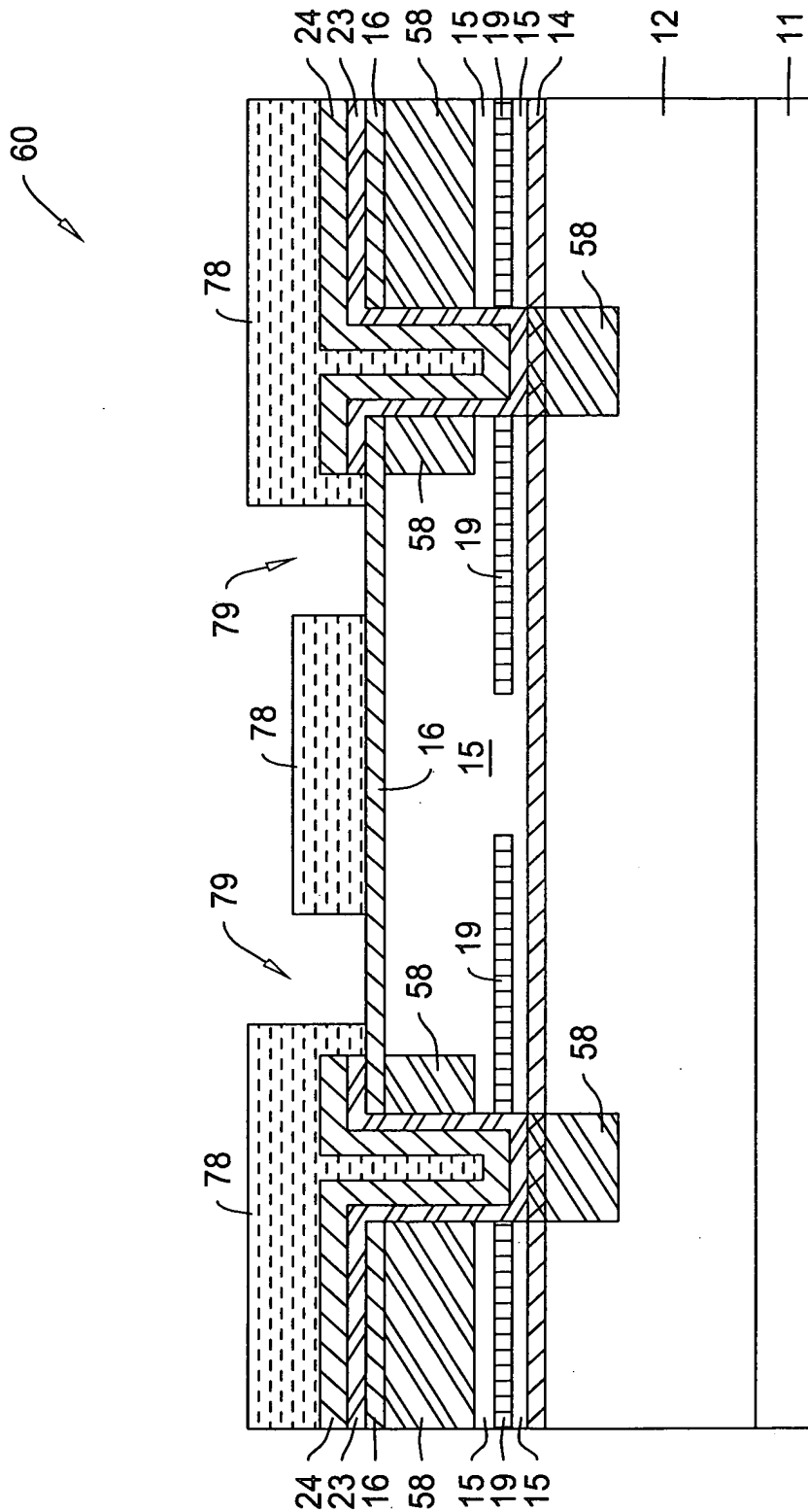


Figure 96

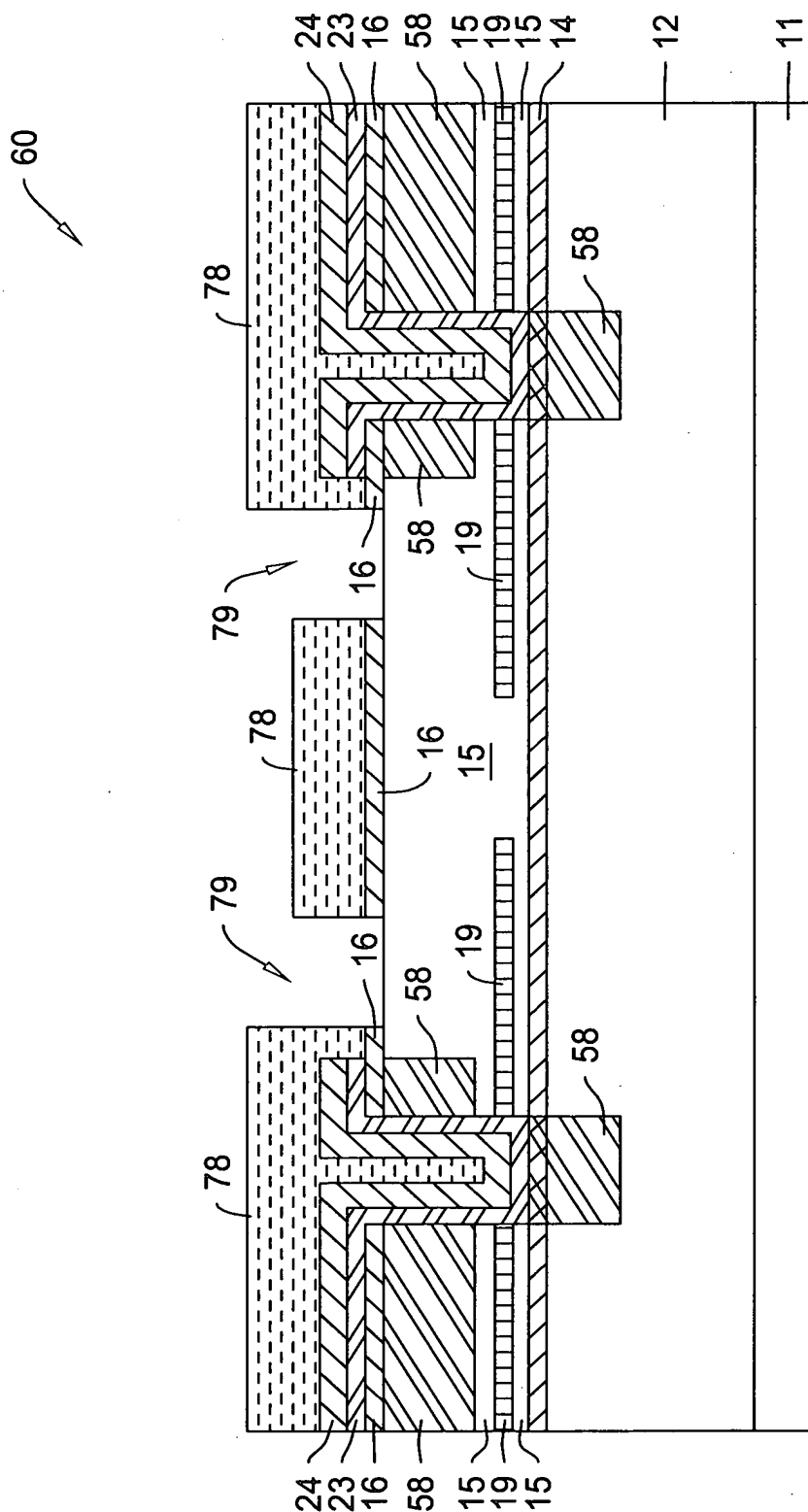
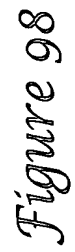


Figure 97



60

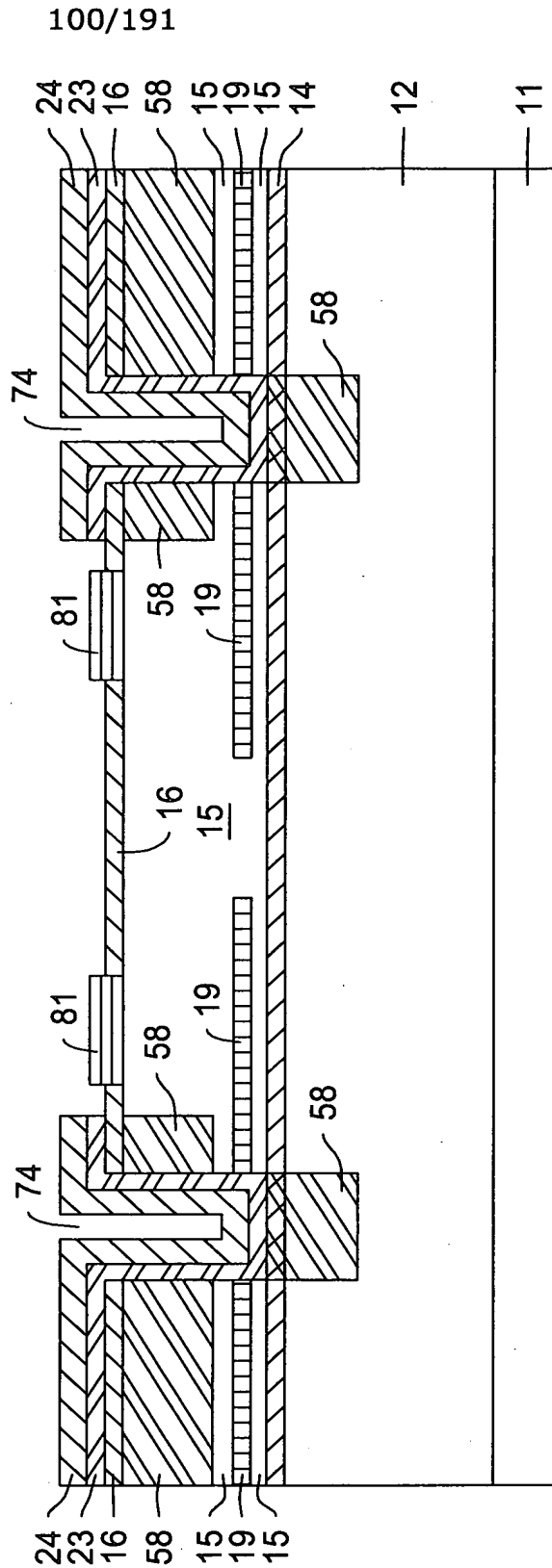


Figure 99

60

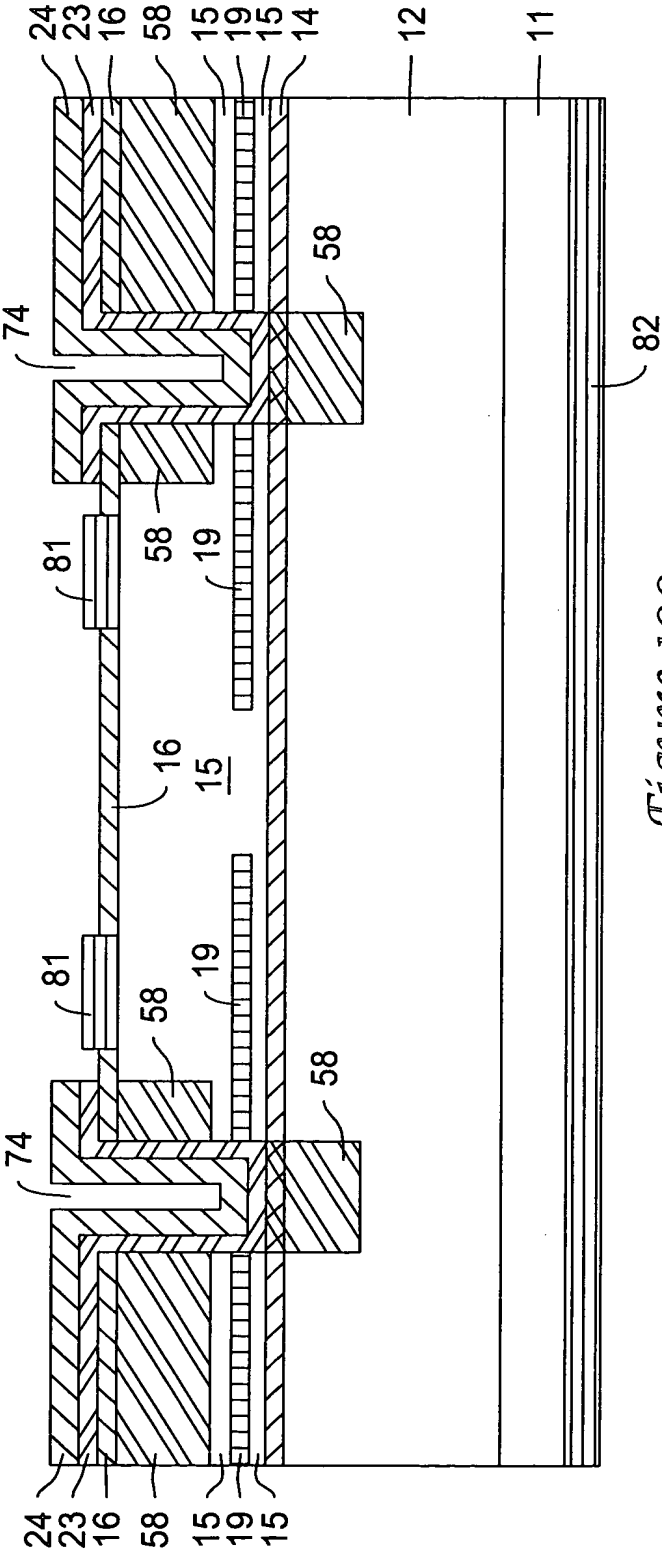


Figure 100

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60

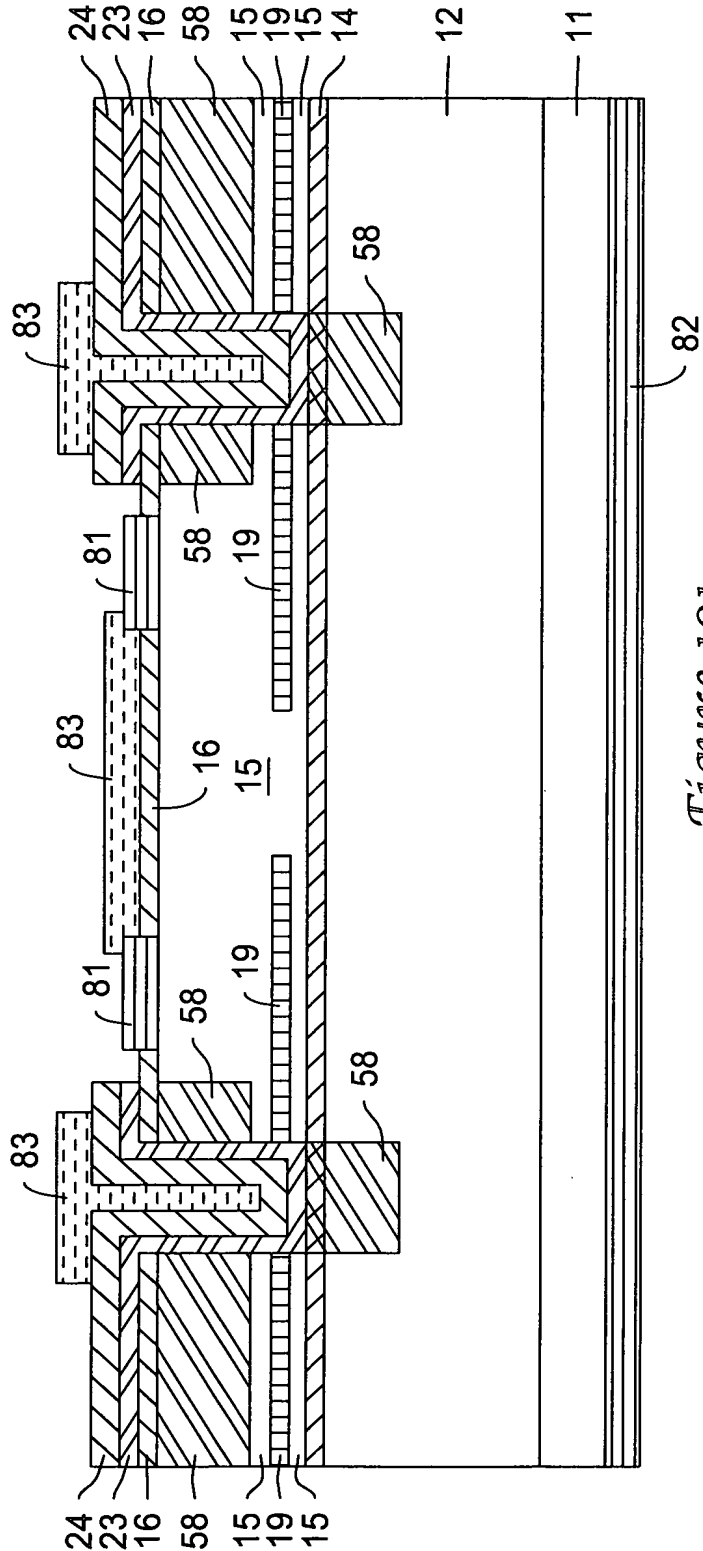


Figure 101

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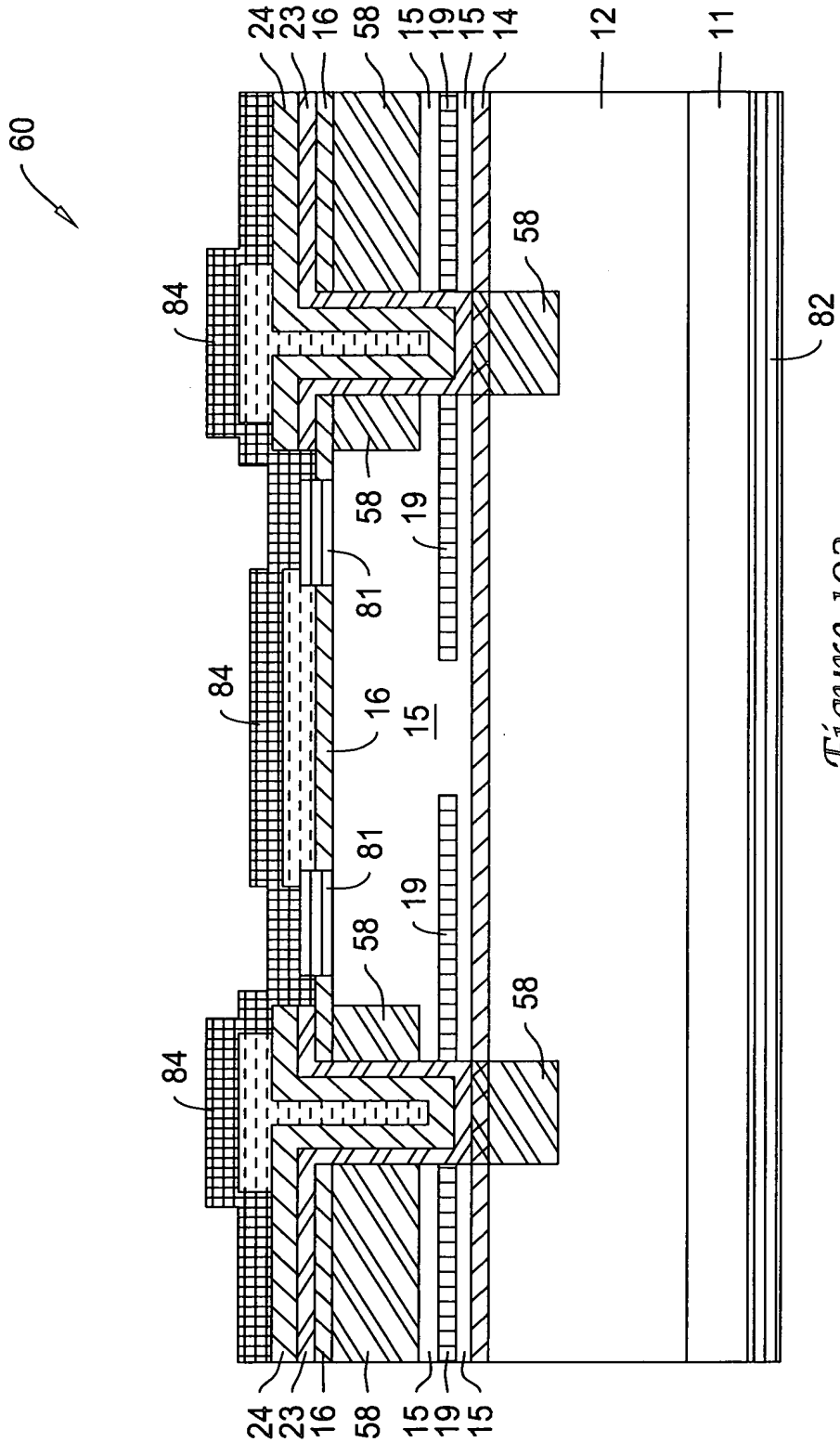
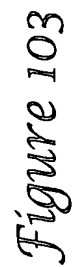
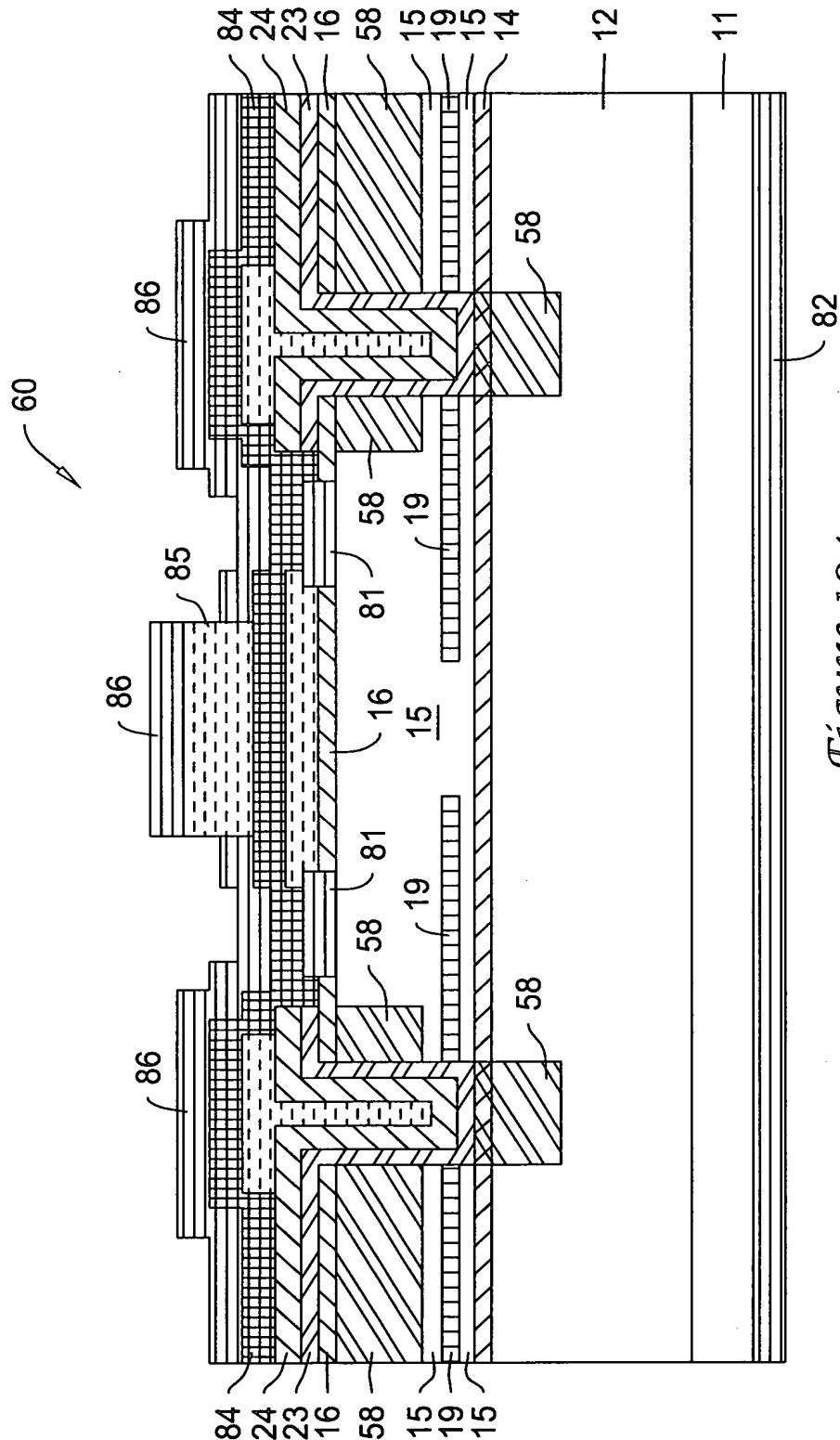


Figure 102





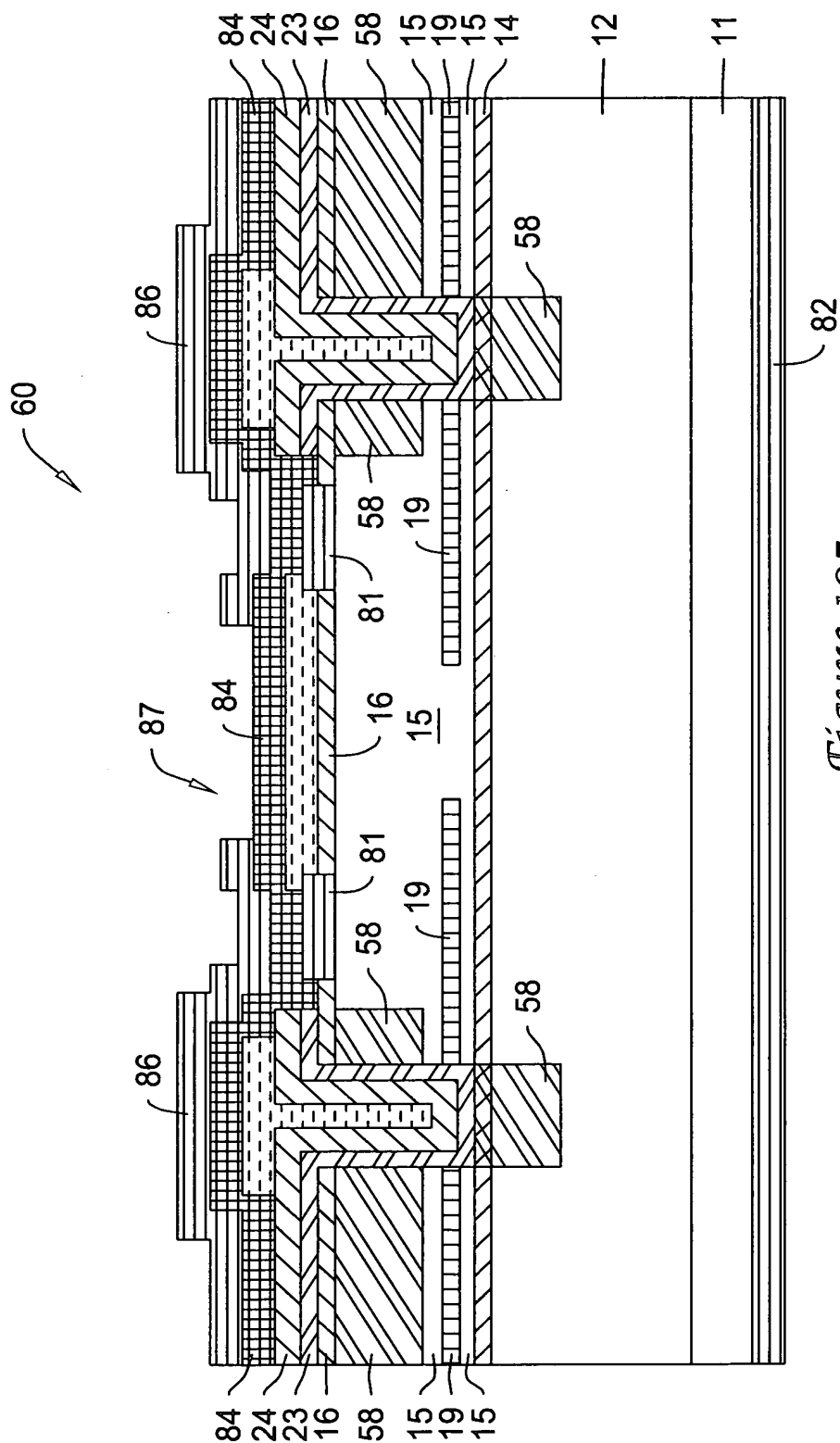


Figure 106

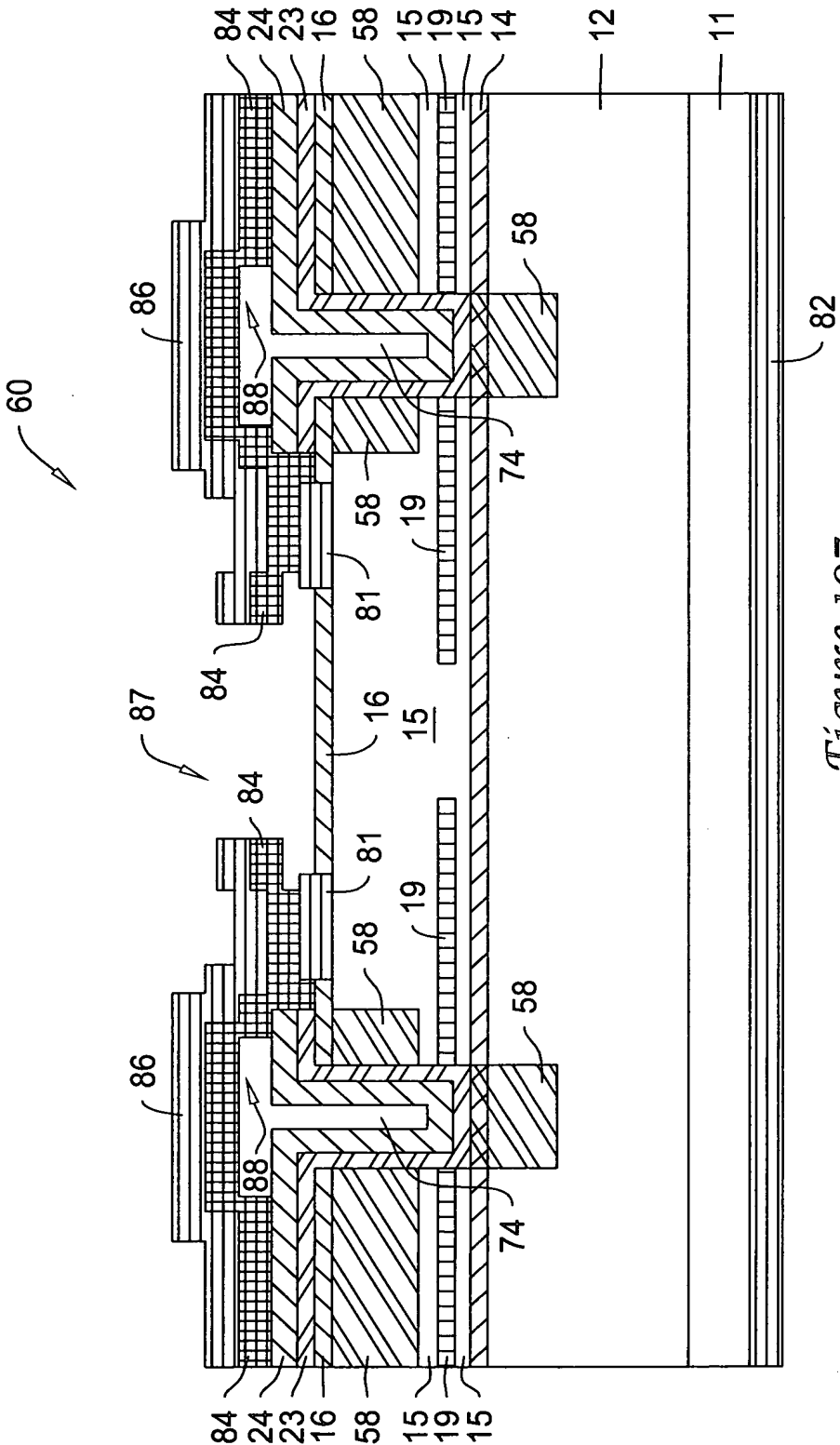


Figure 107

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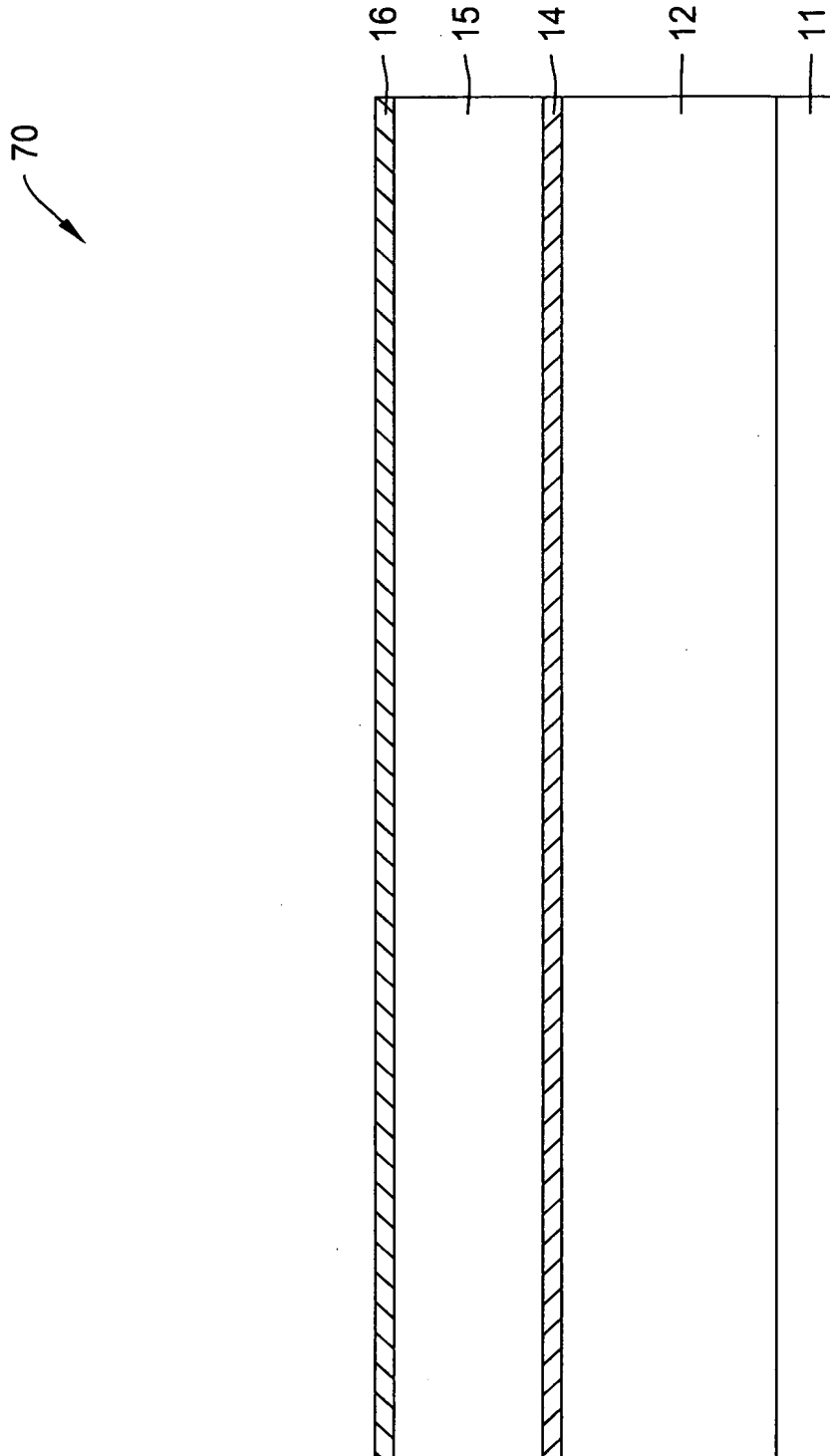


Figure 108

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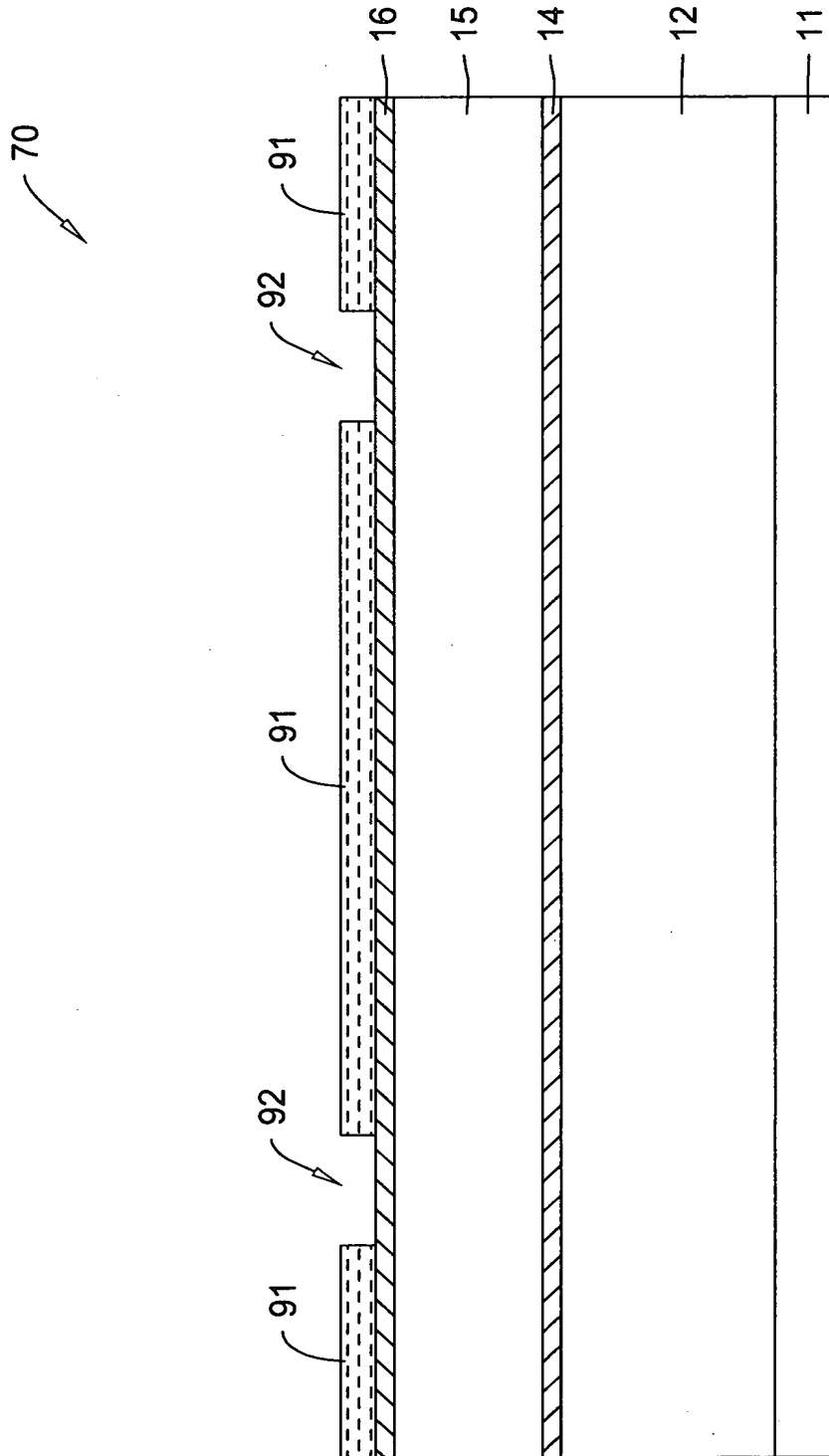


Figure 109

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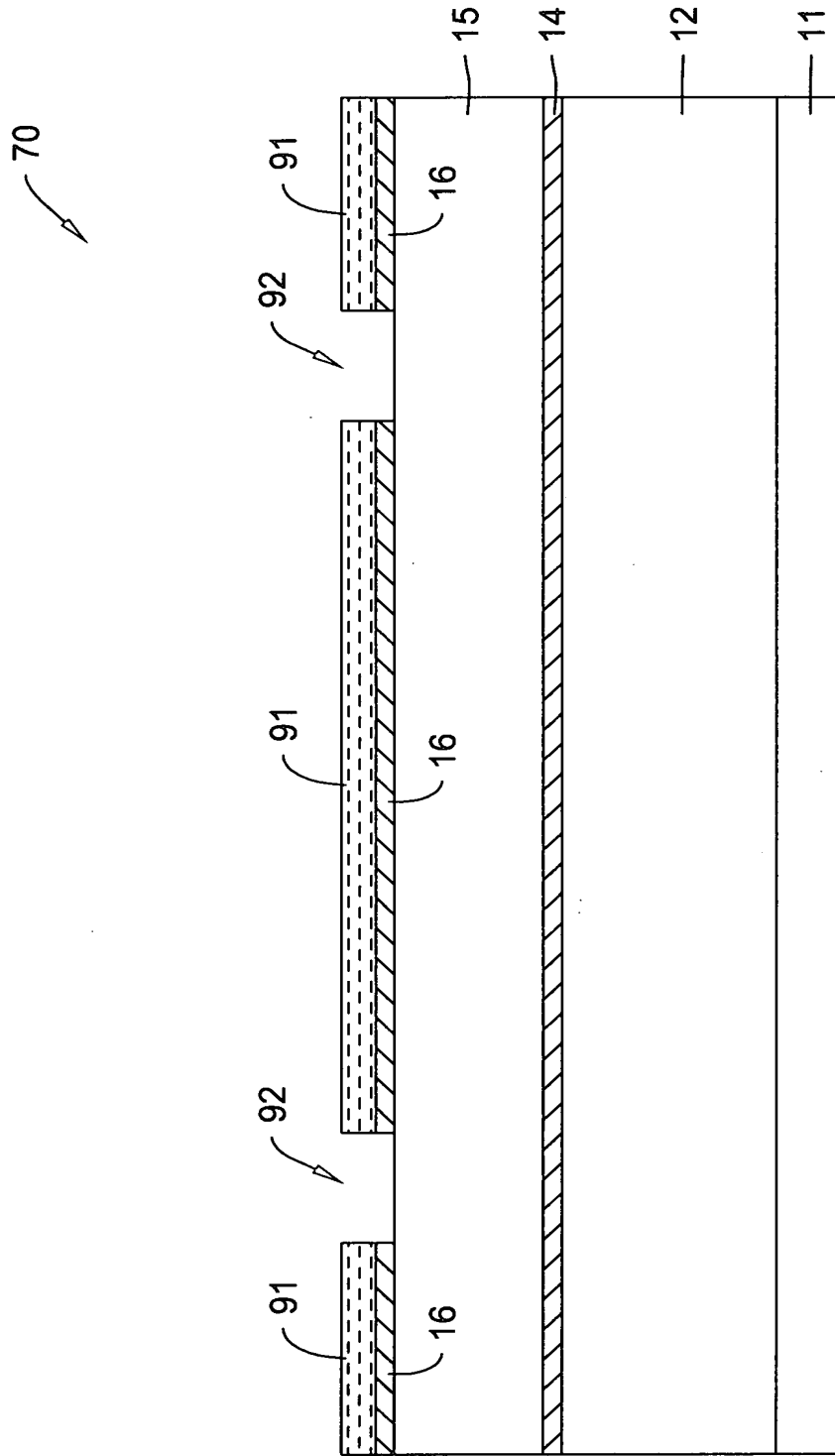


Figure 110

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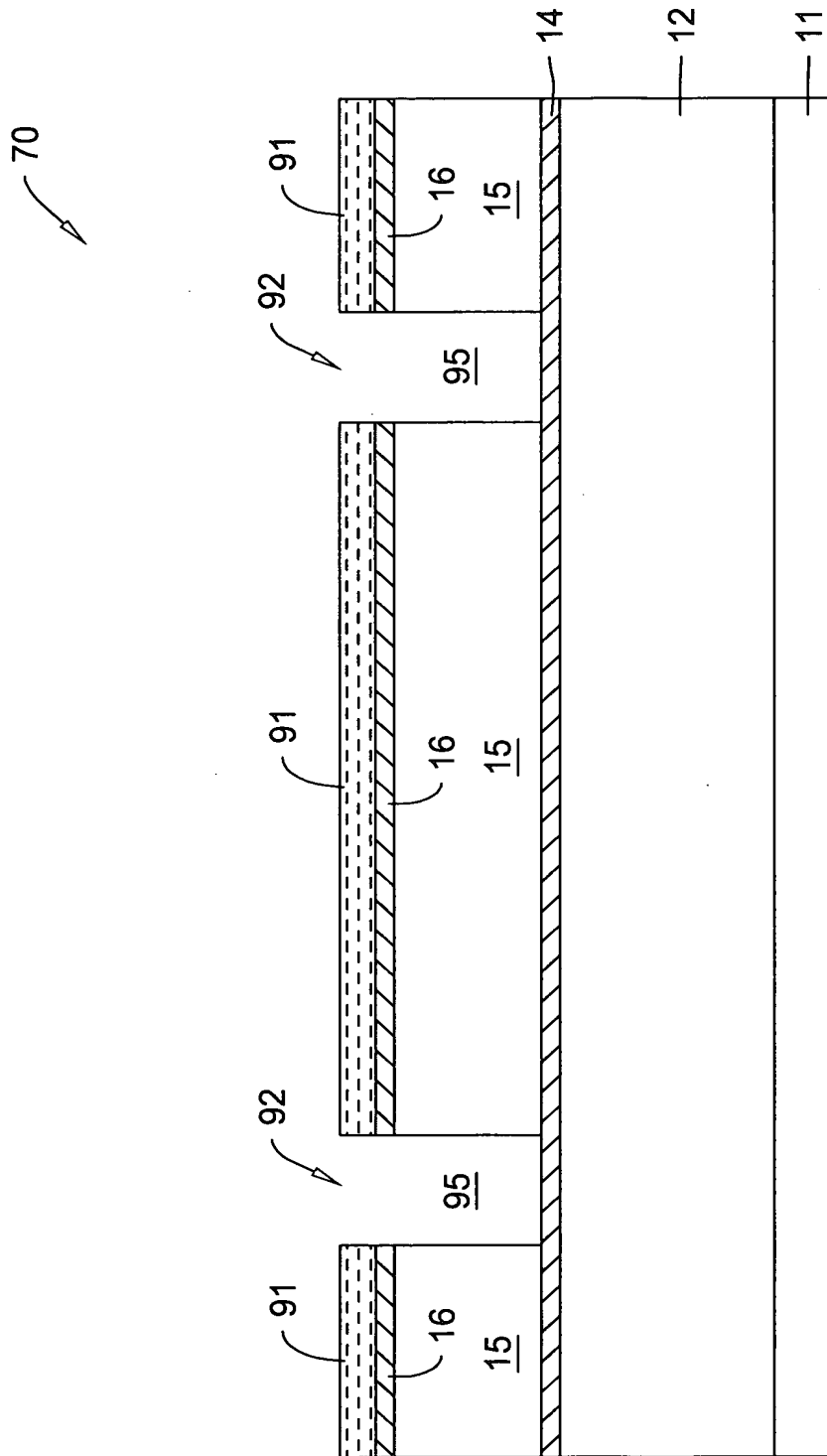


Figure 111

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70 ↗

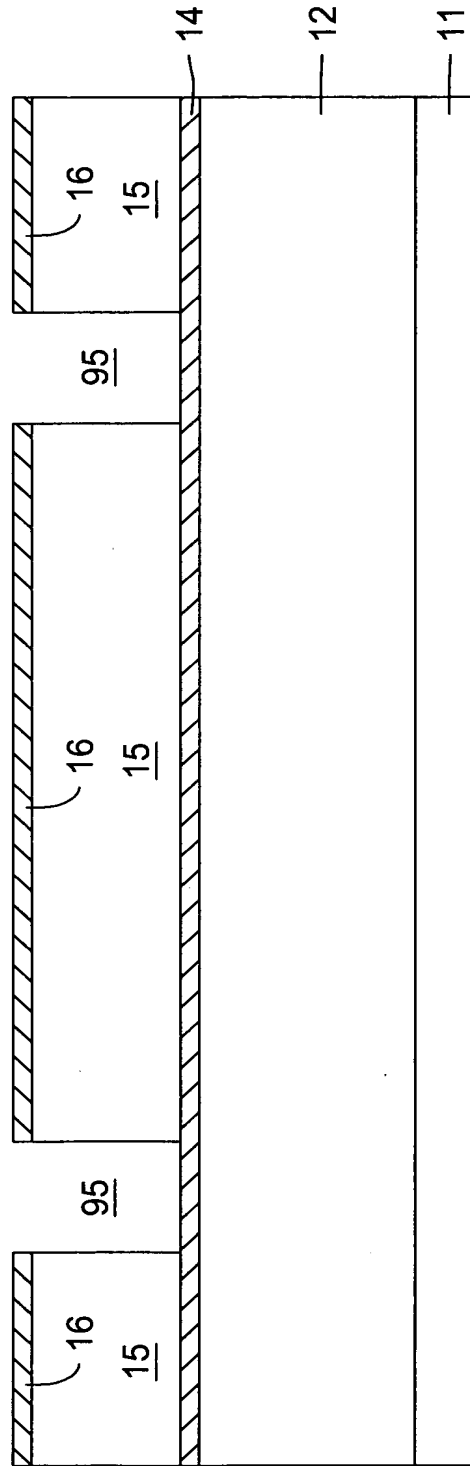


Figure 112

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70 ↗

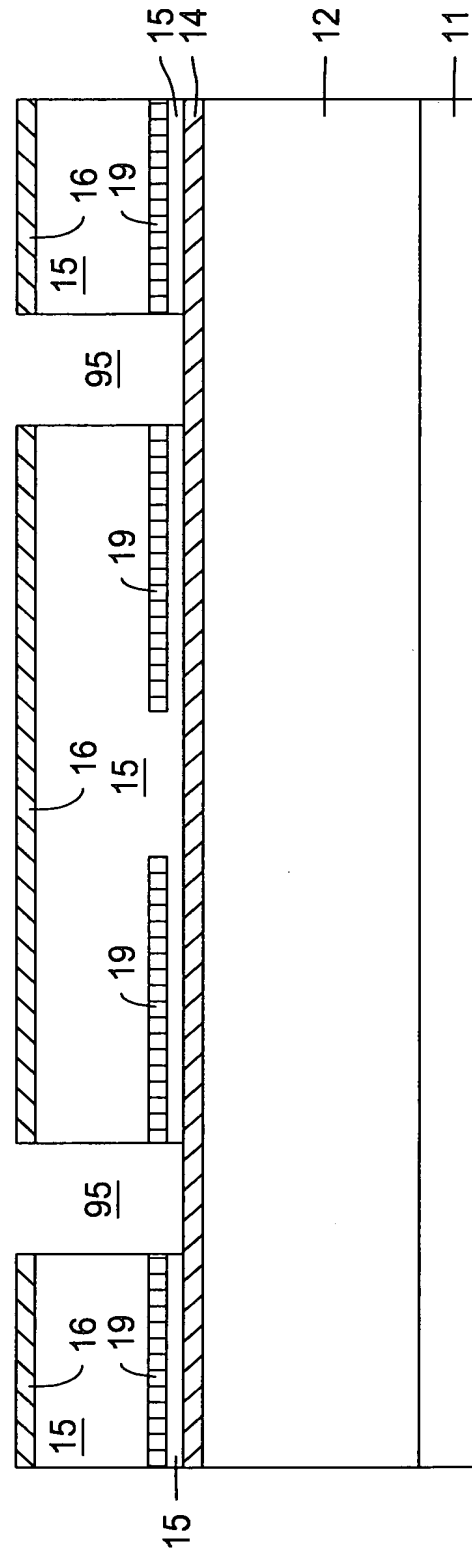


Figure 113

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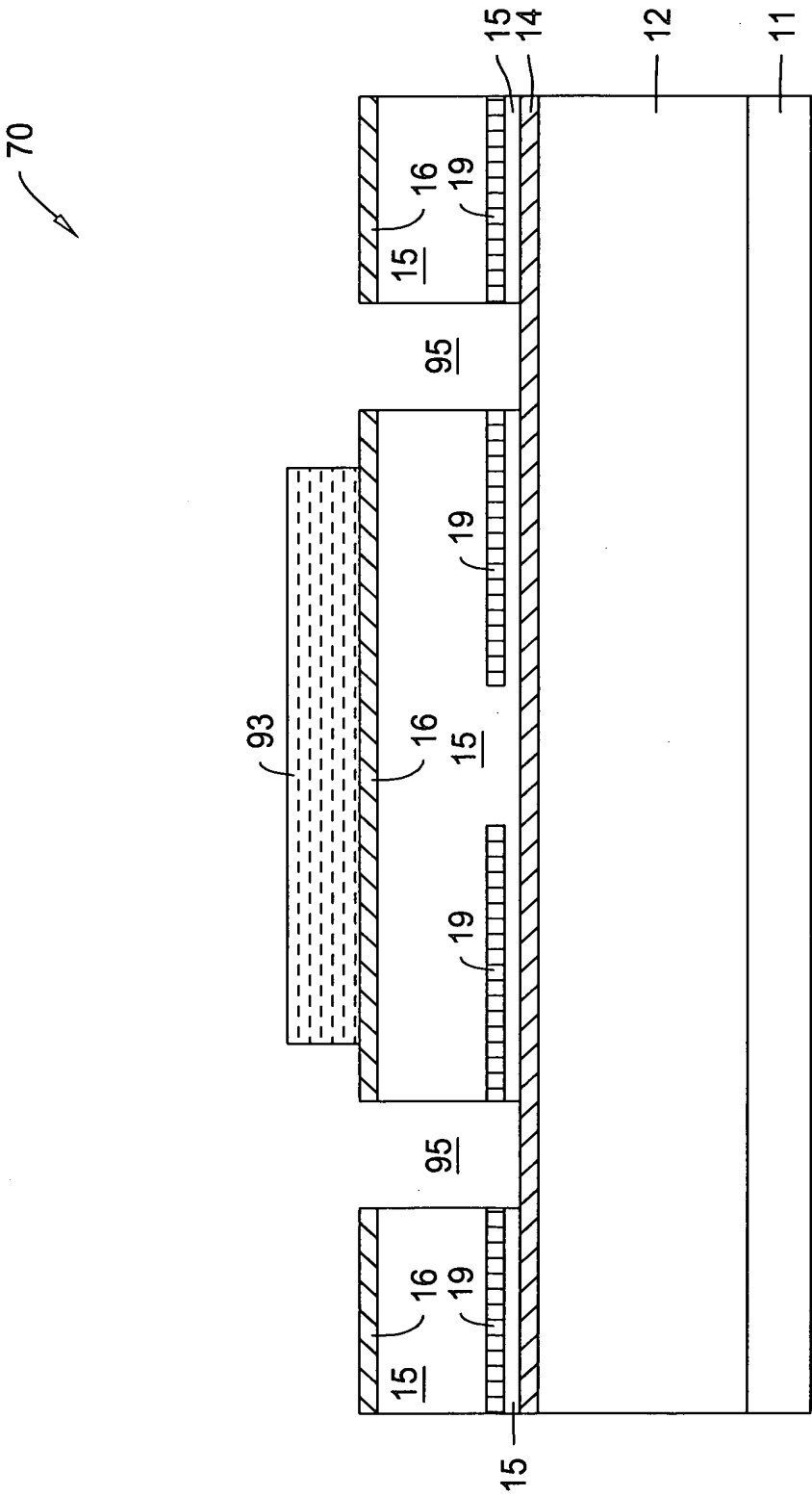


Figure 114

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70

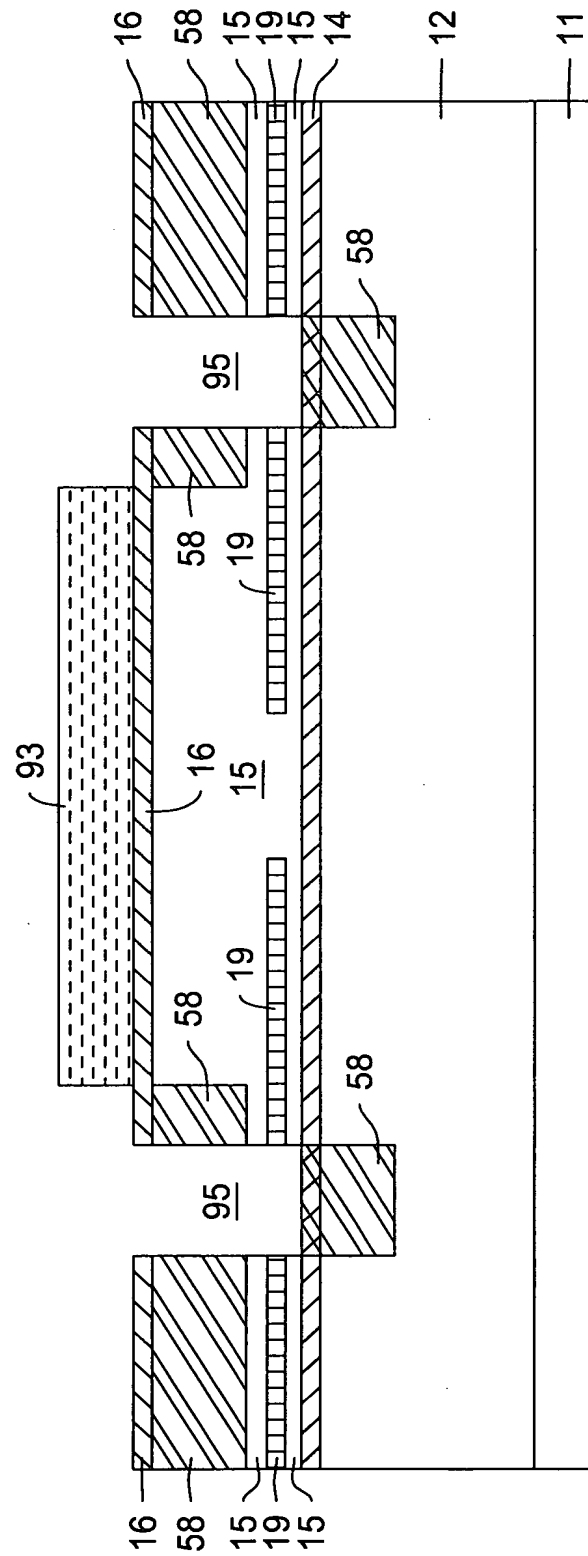


Figure 115

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70 ↗

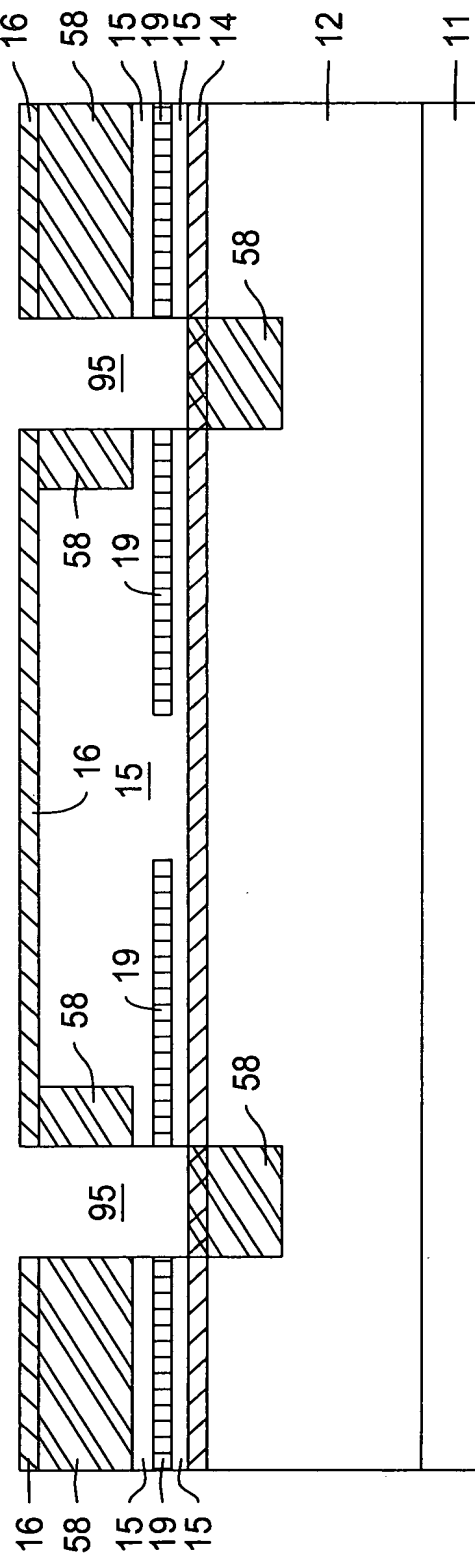


Figure 116

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70

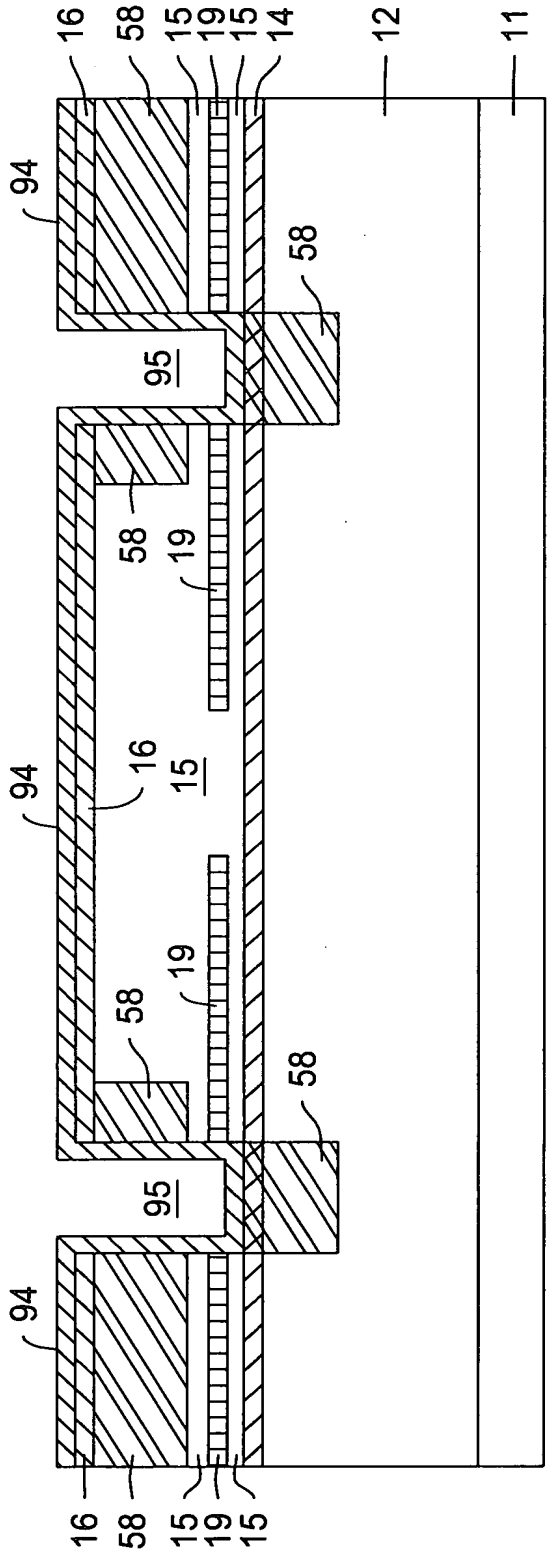


Figure 117

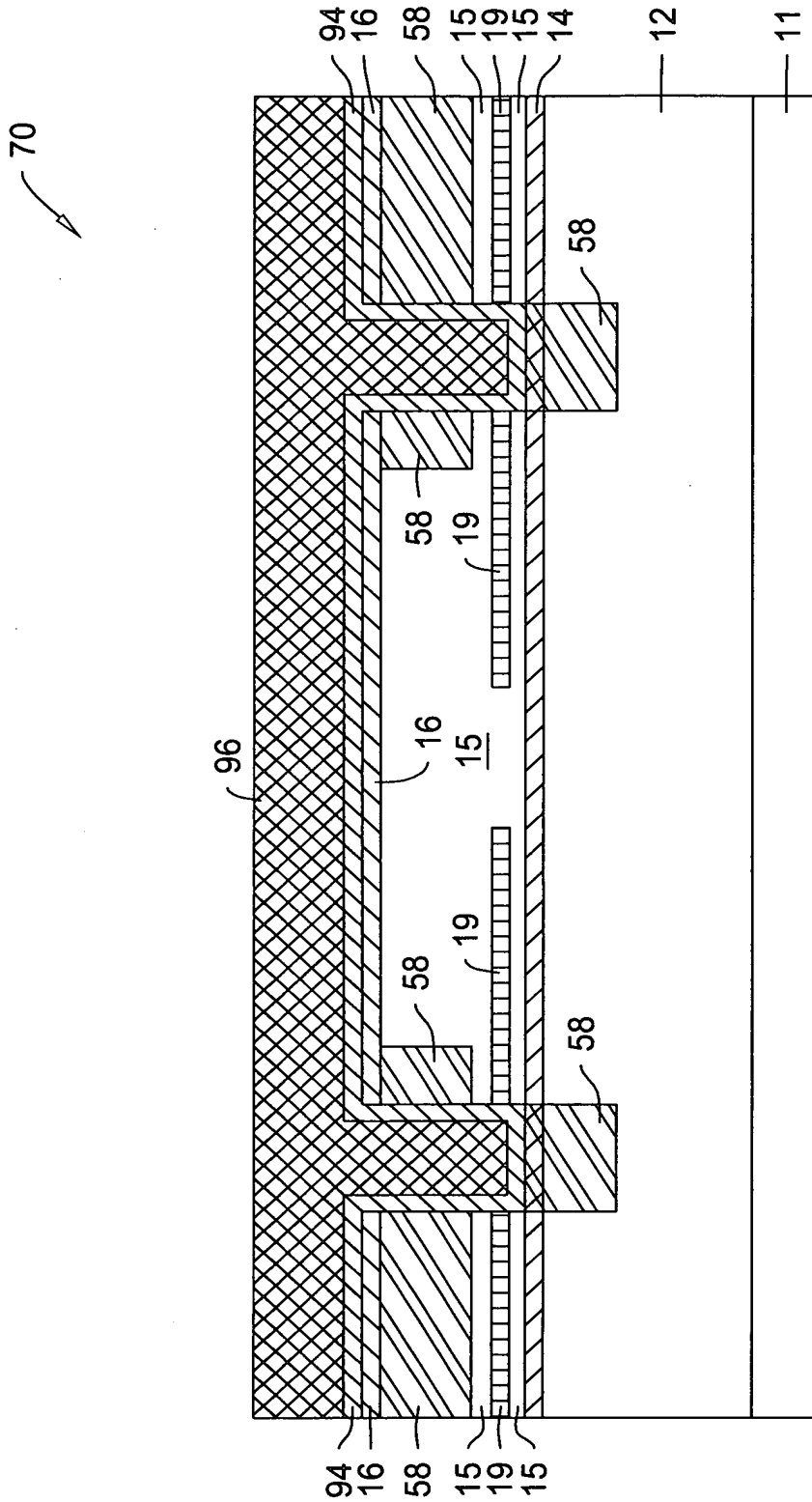


Figure 118

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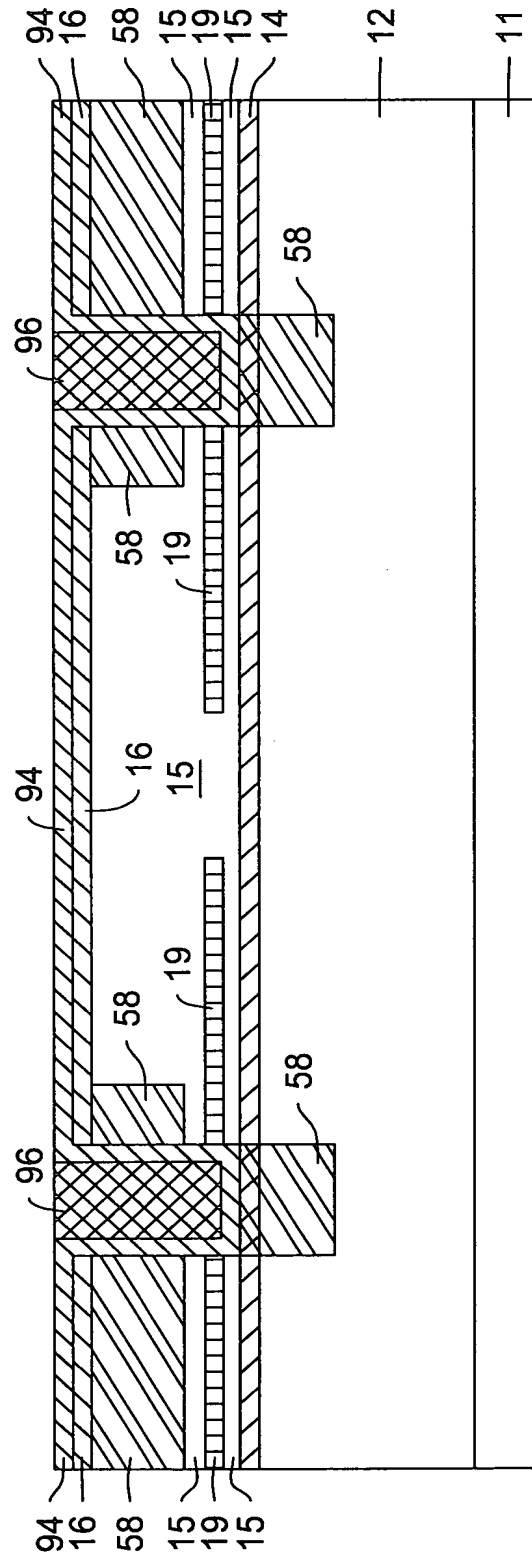
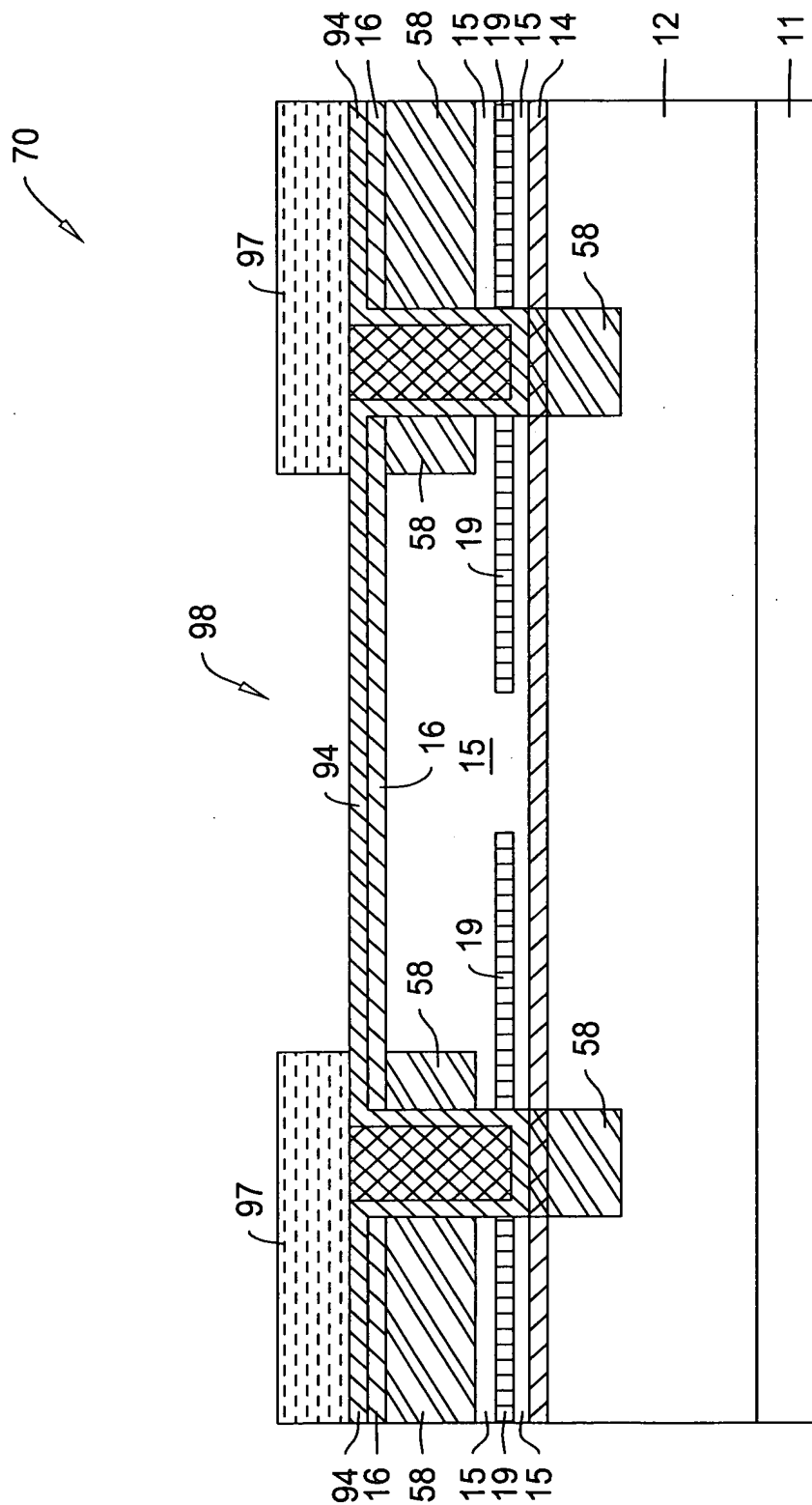


Figure 119



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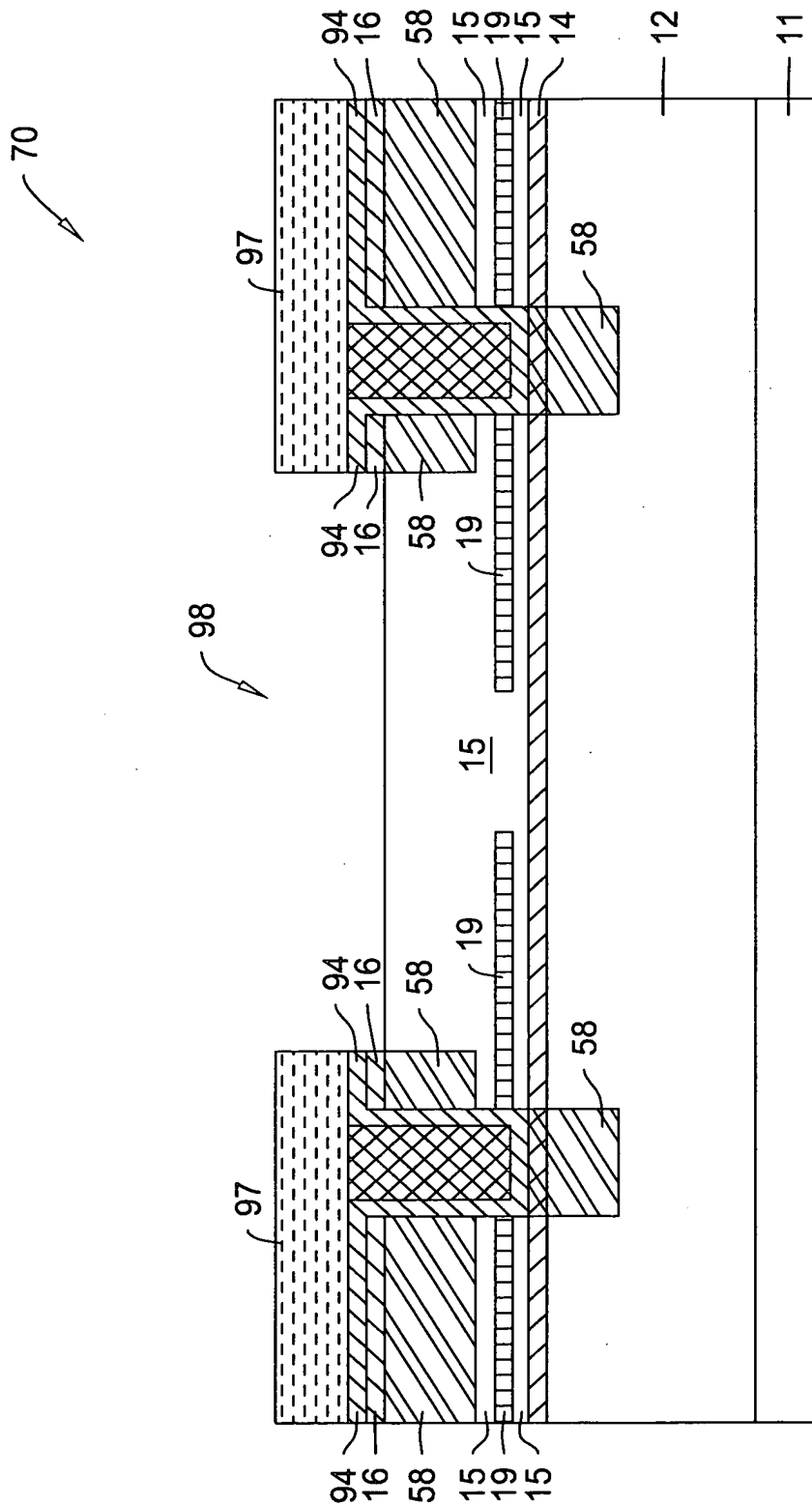


Figure 121

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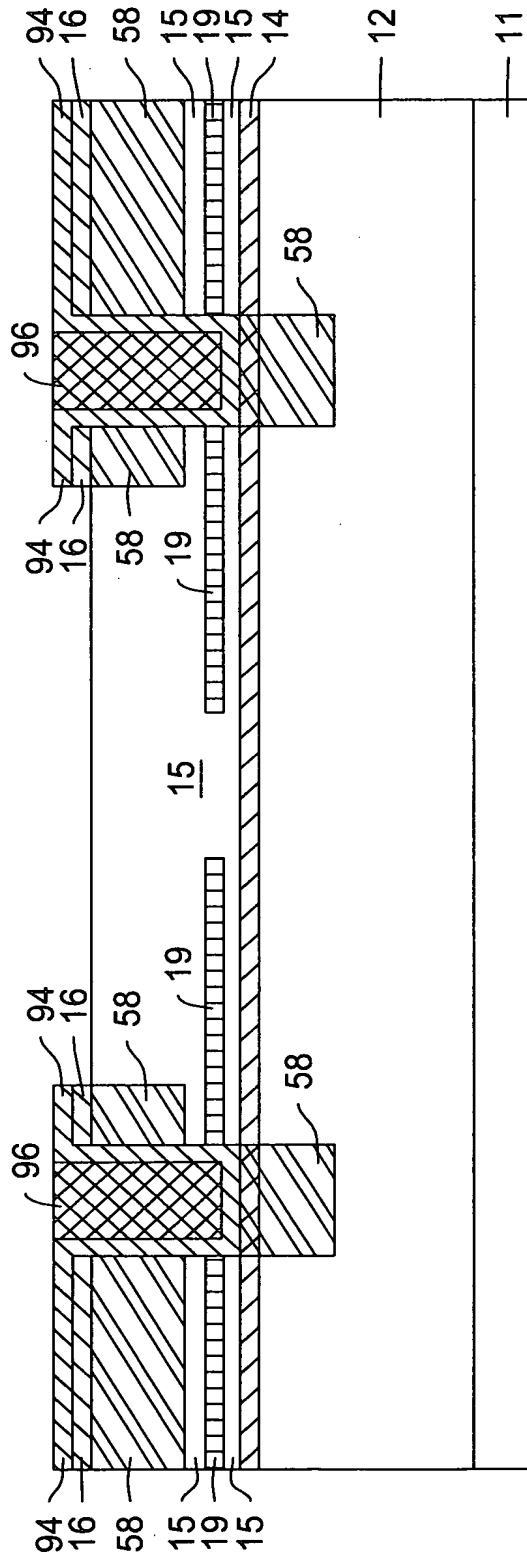
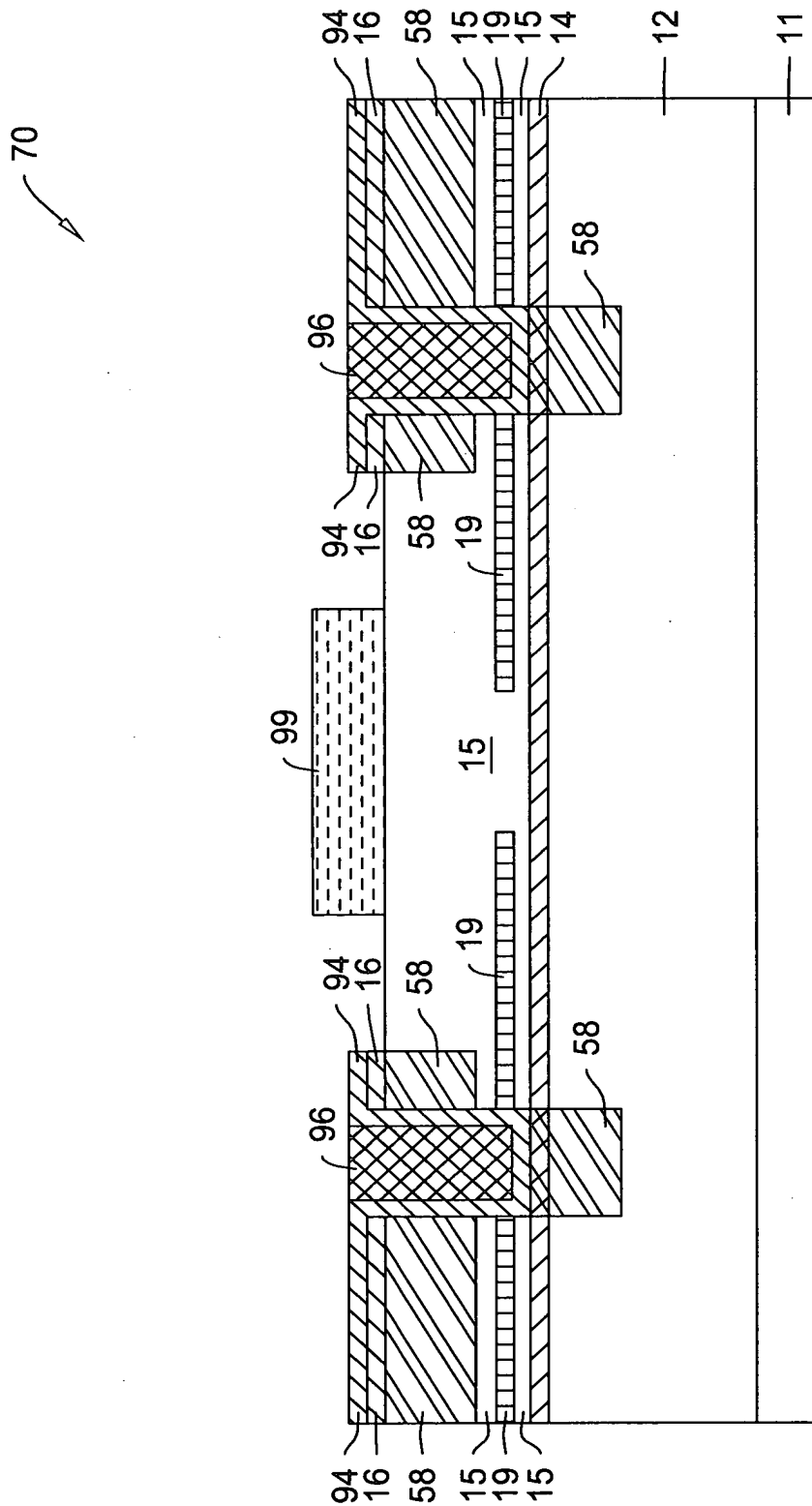
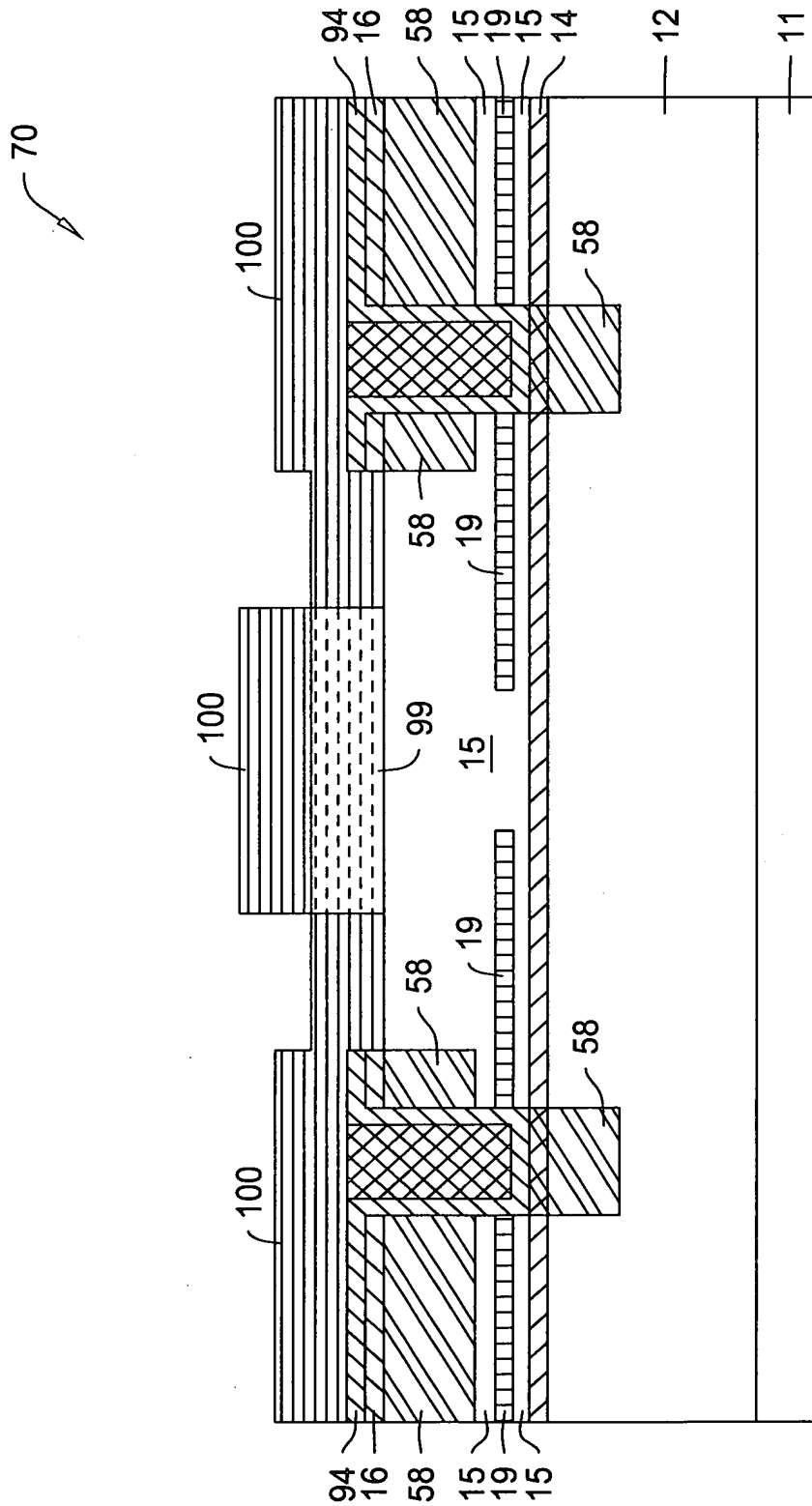


Figure 122





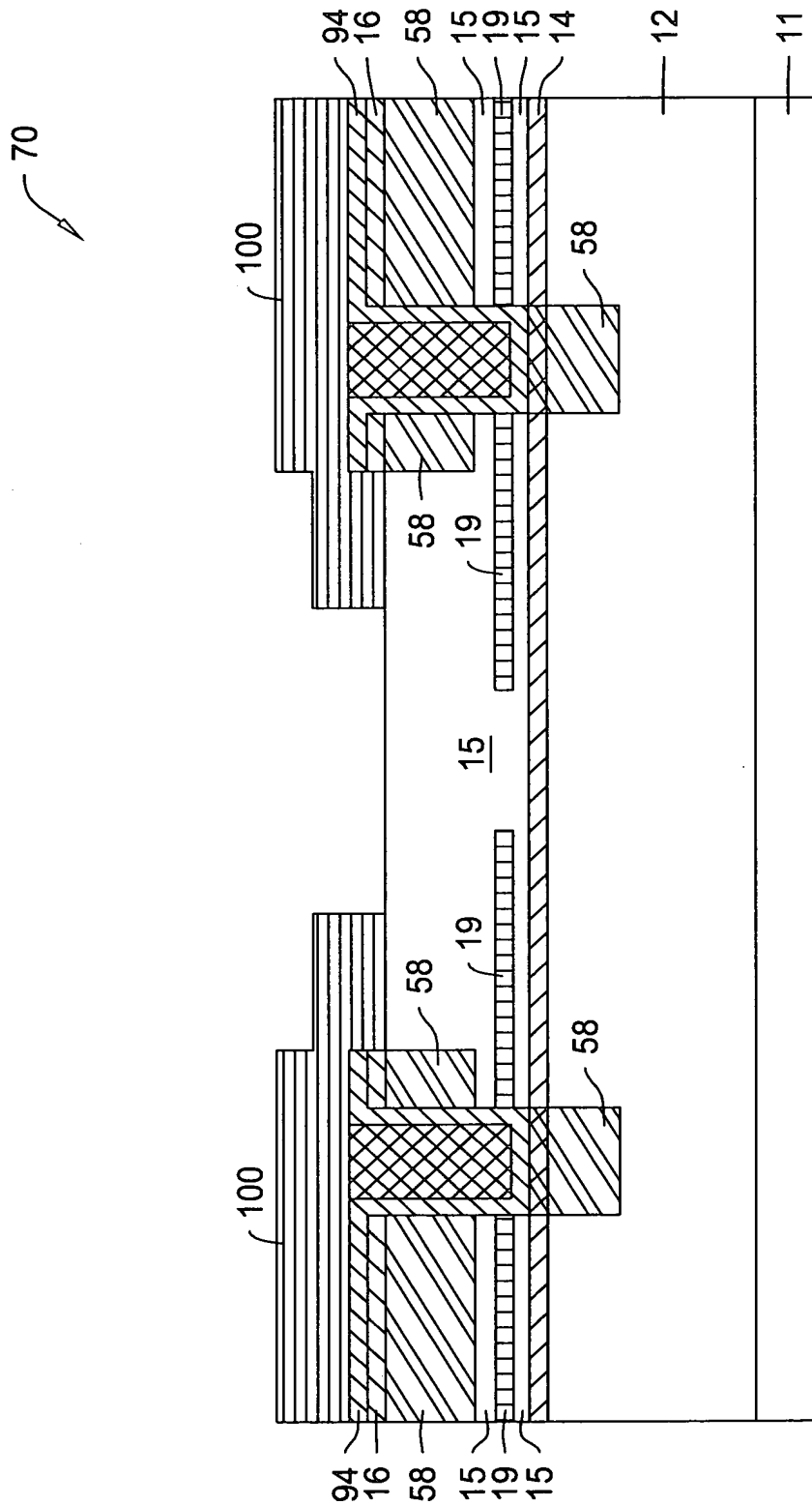


Figure 125

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80

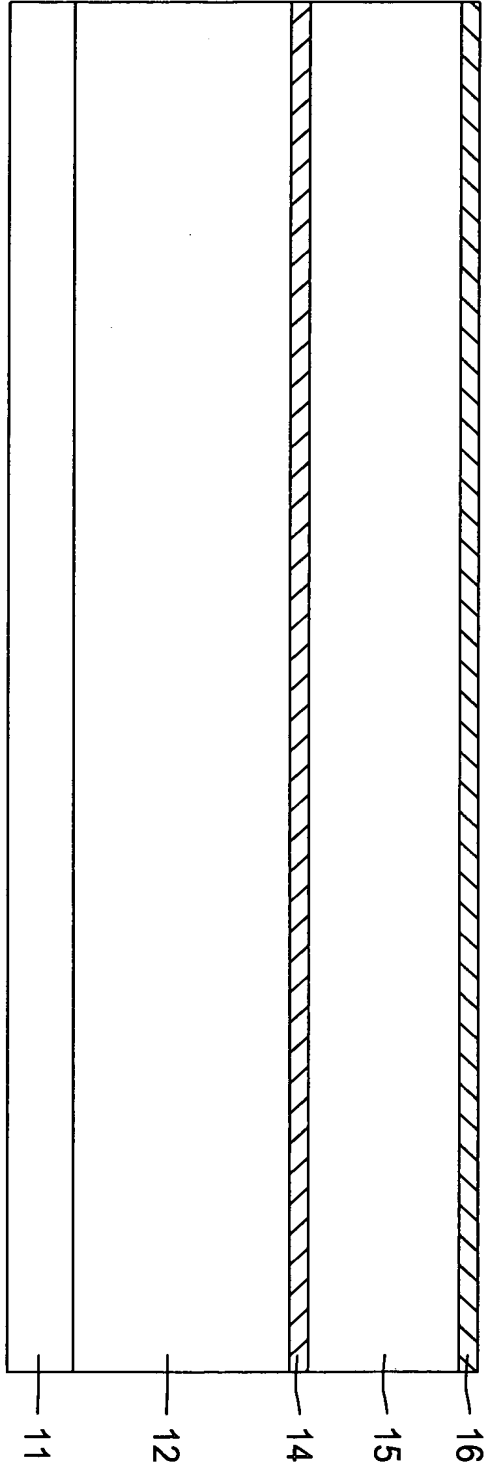


Figure 127

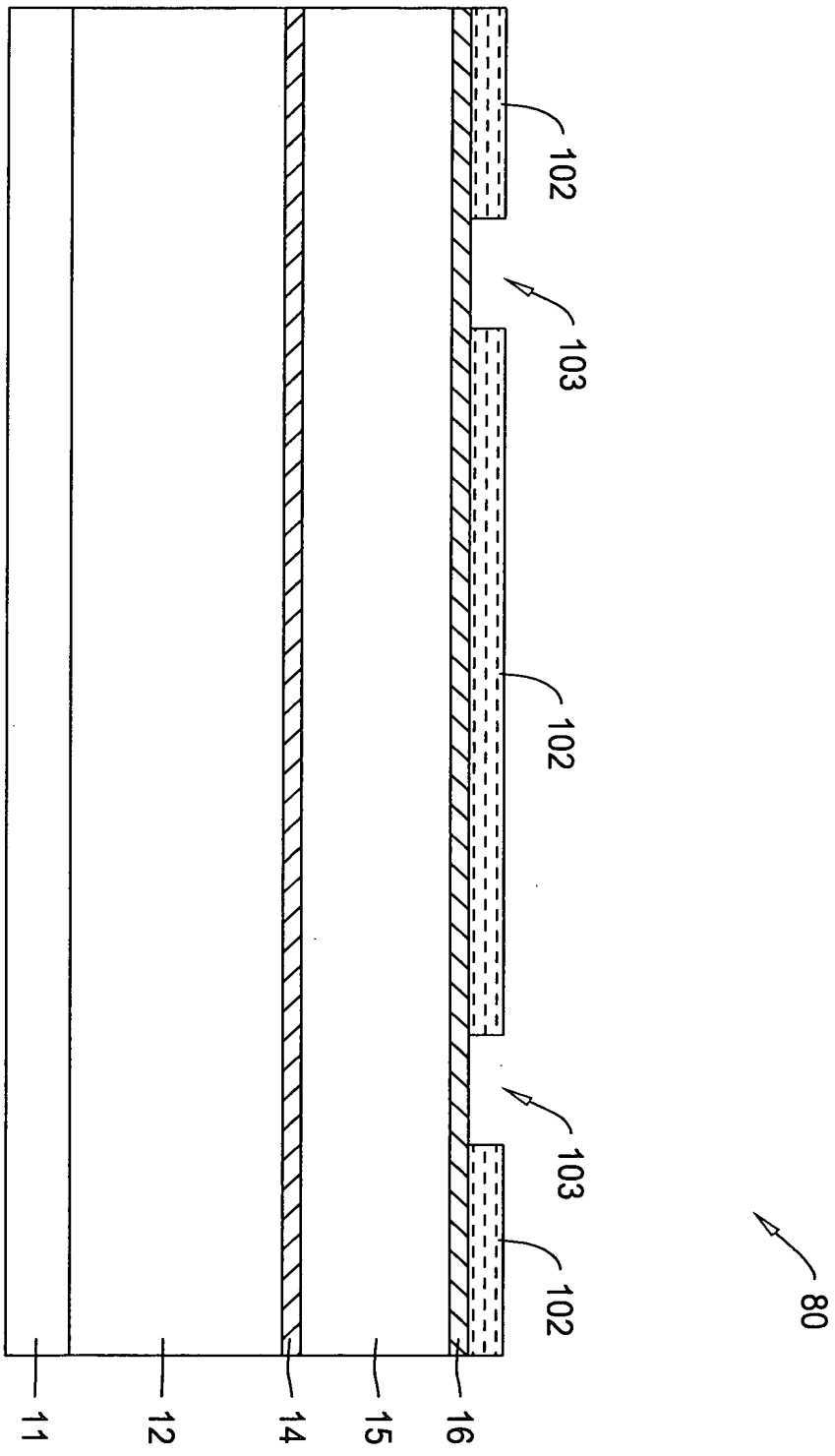
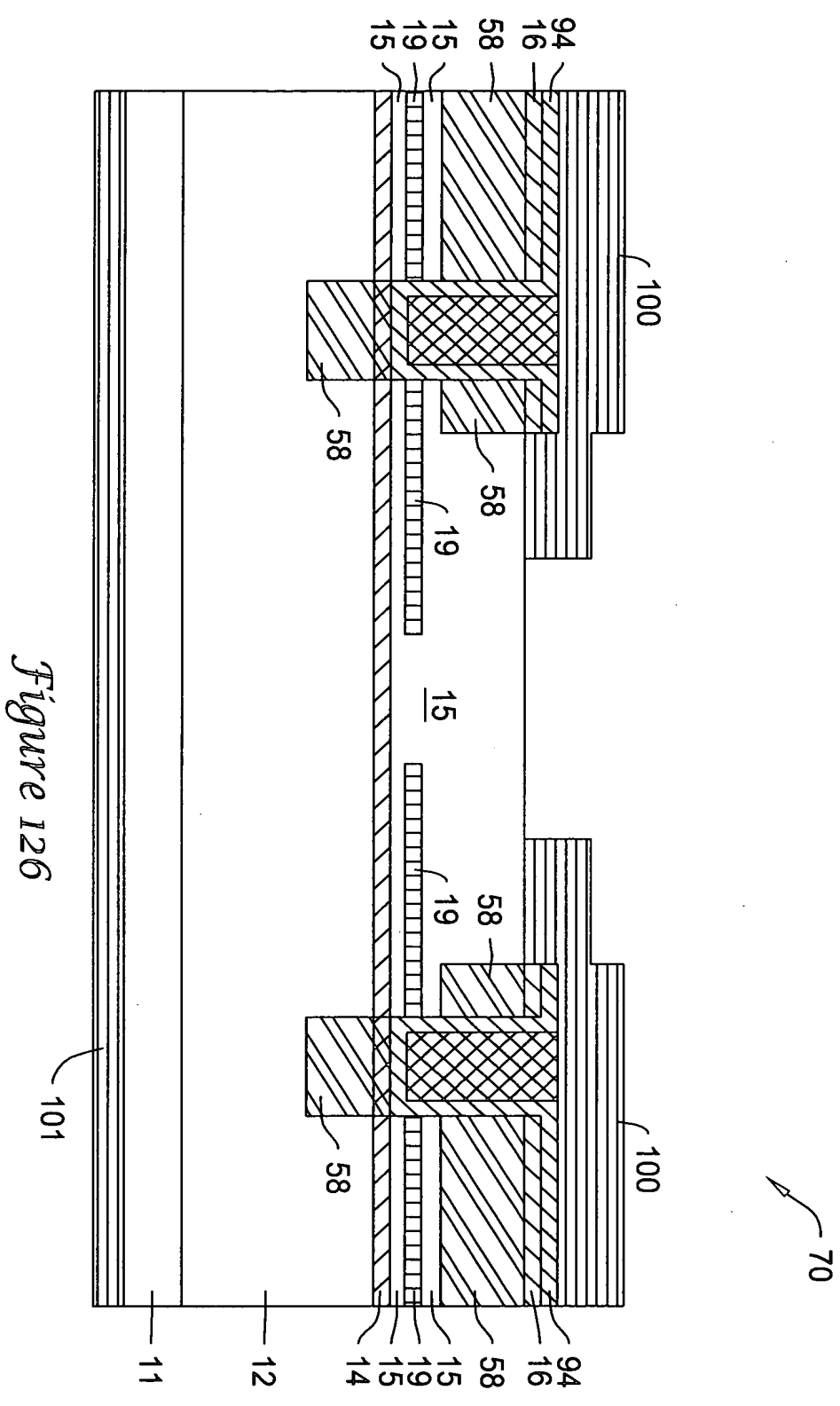


Figure 128

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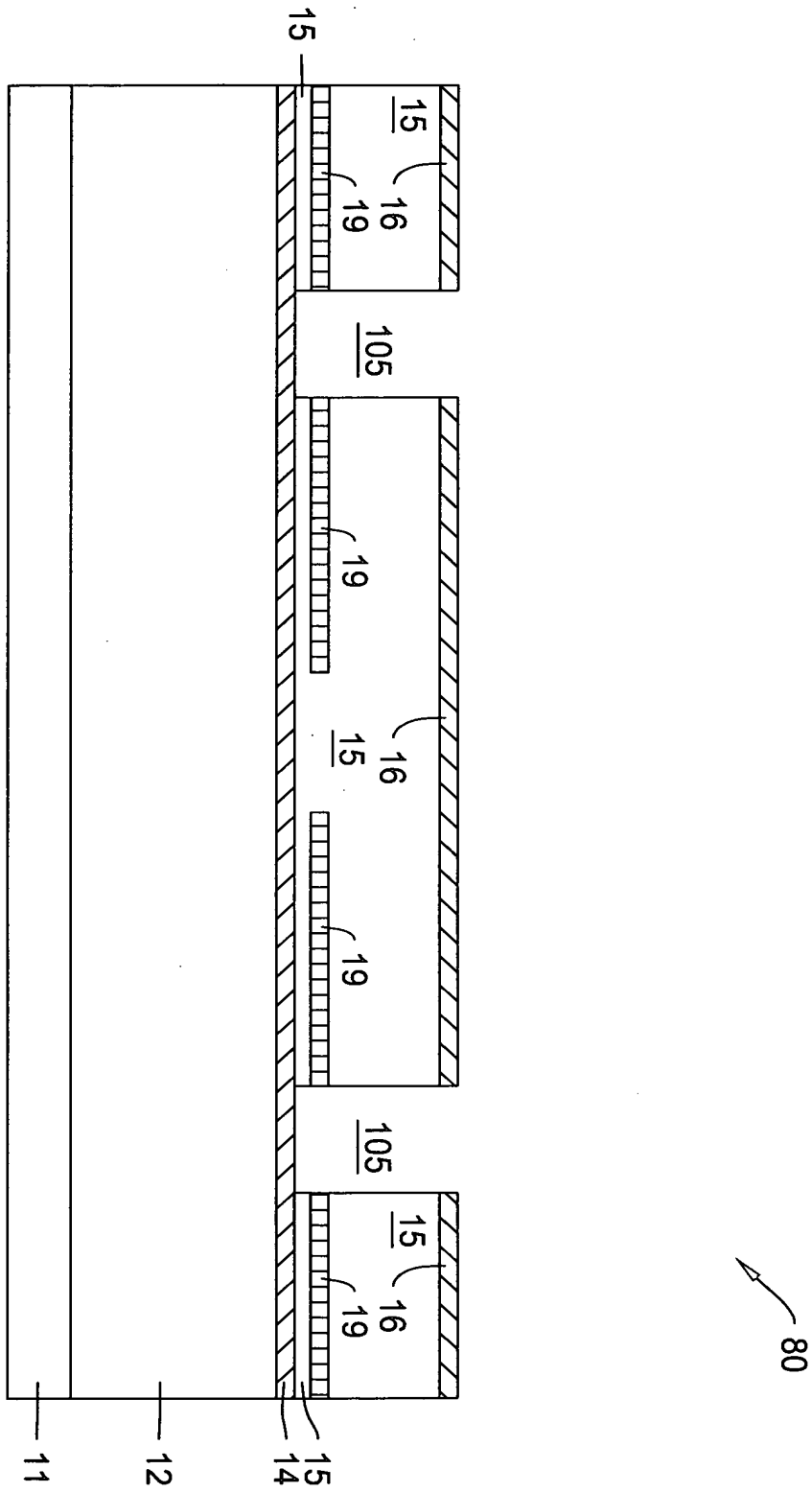


Figure 132

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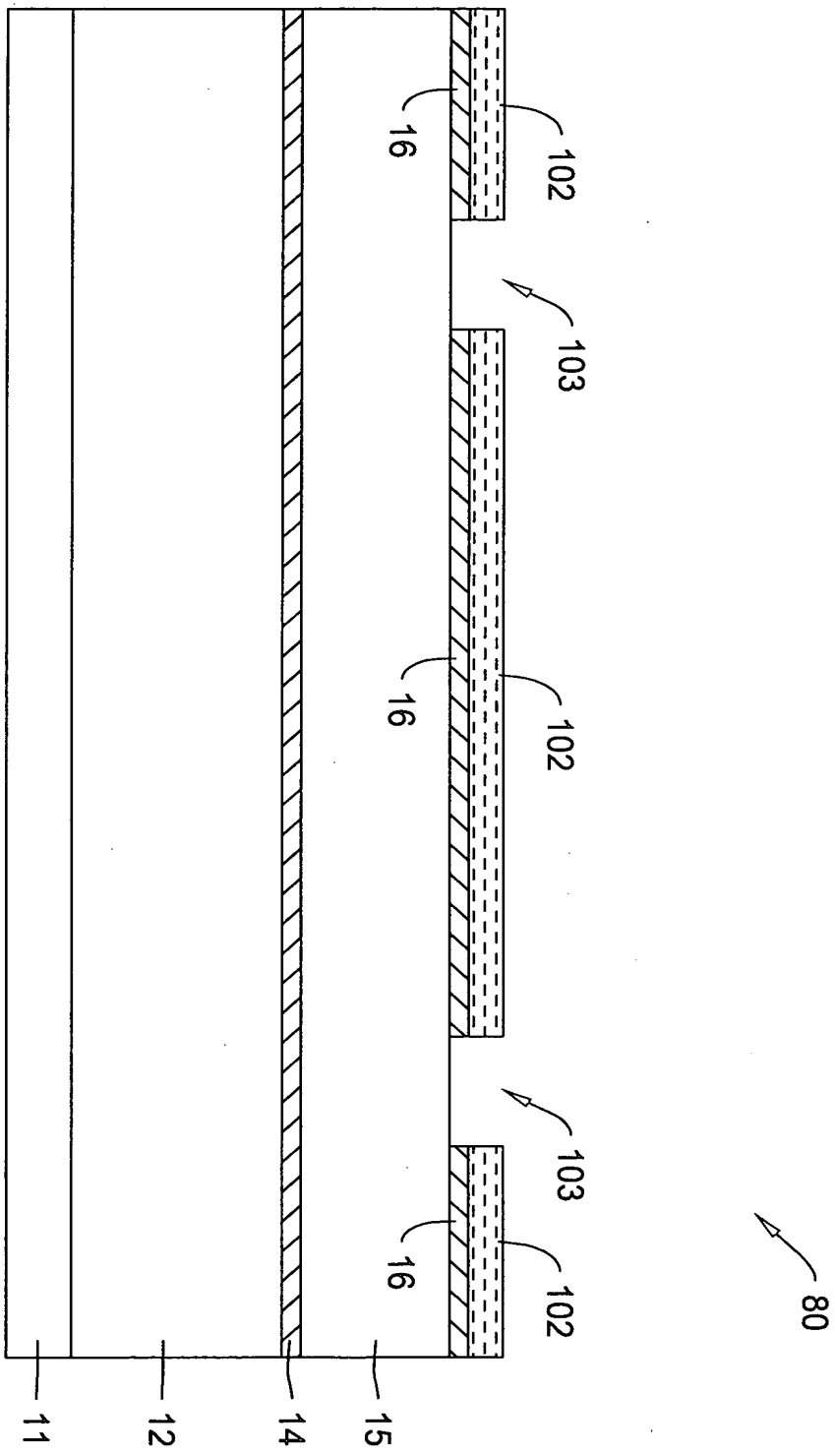


Figure 129



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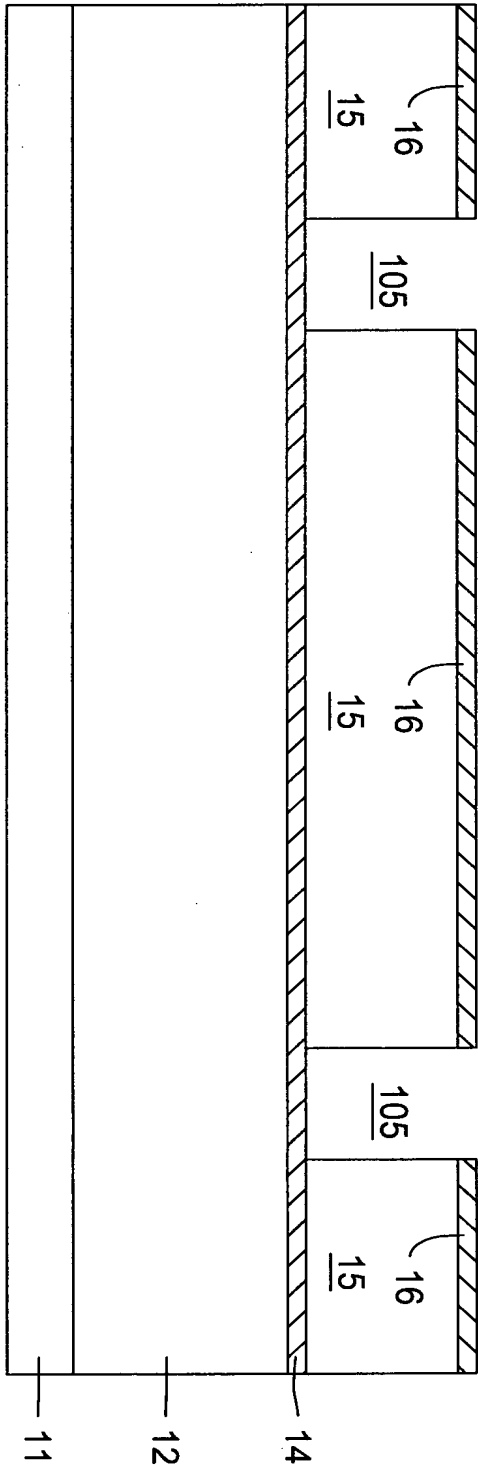


Figure 131

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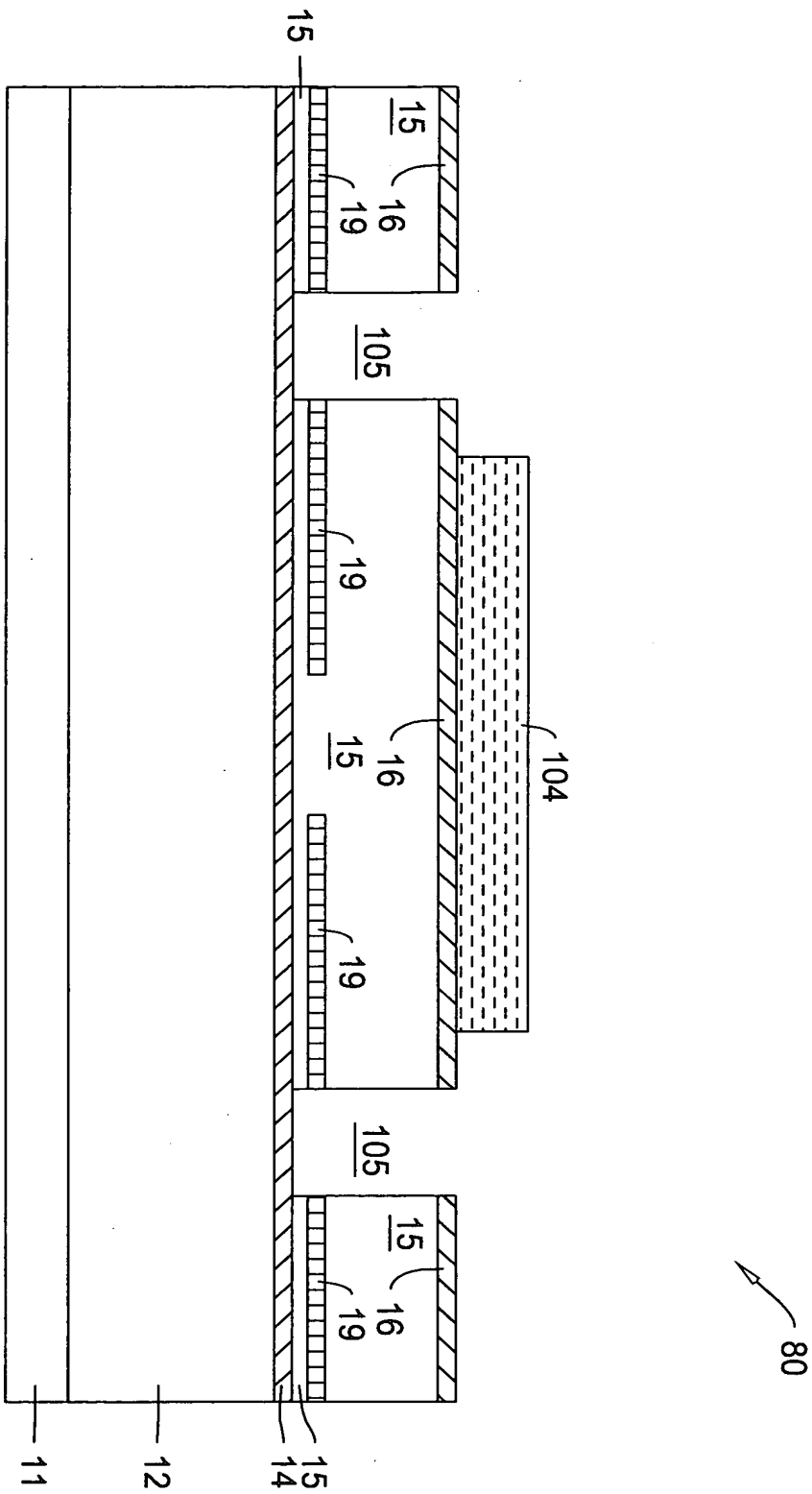


Figure 133

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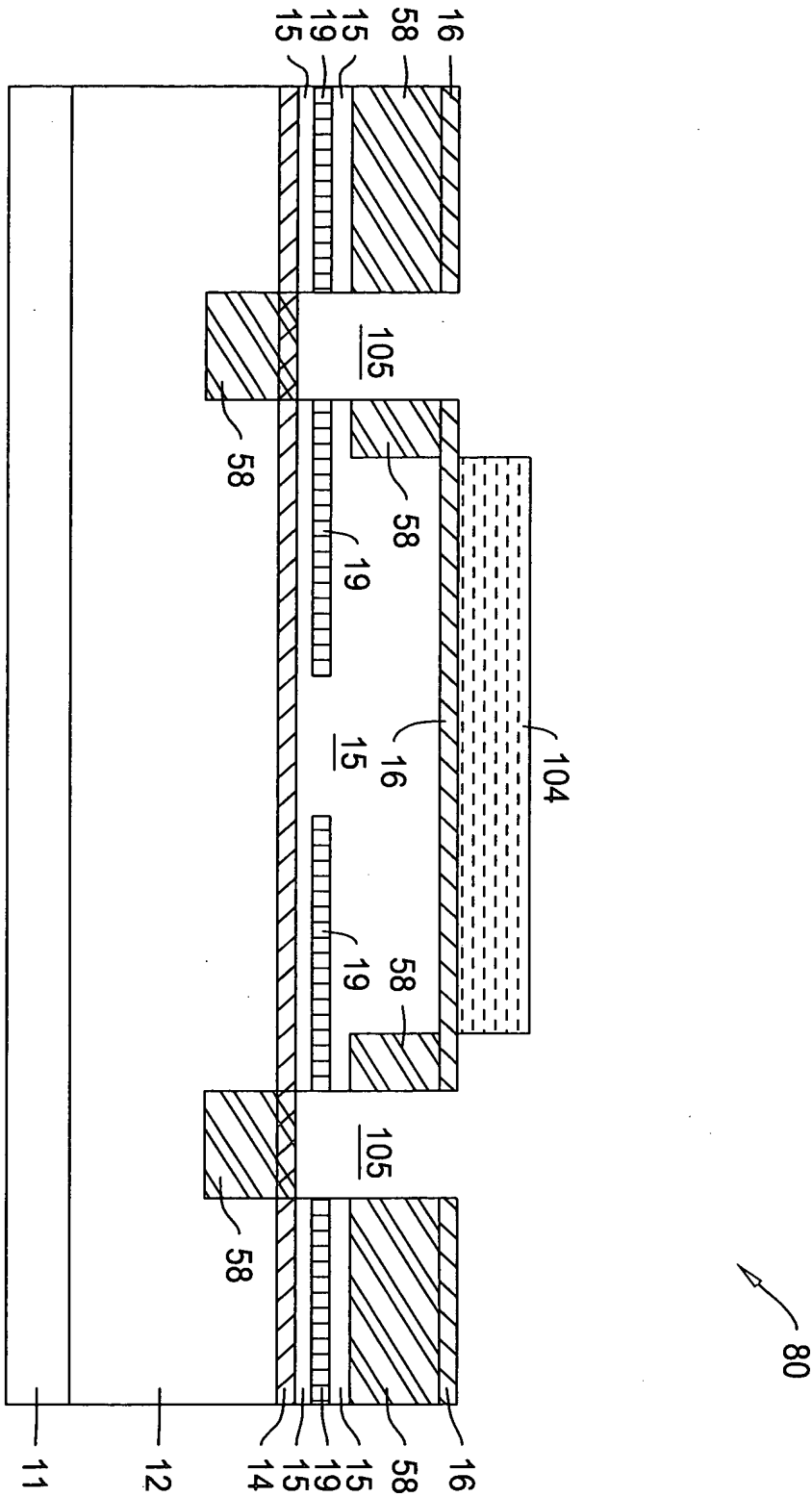
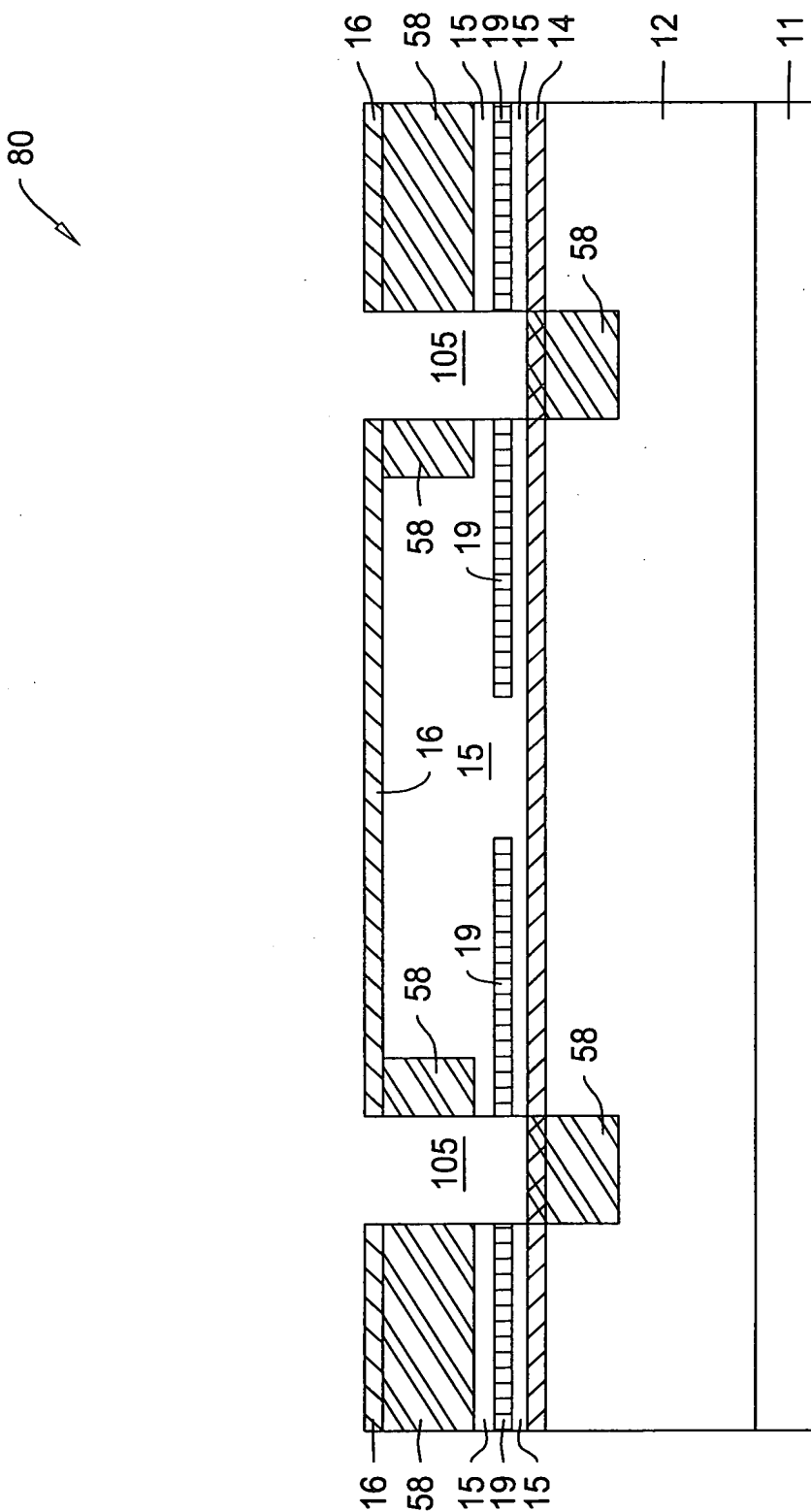


Figure 134



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80

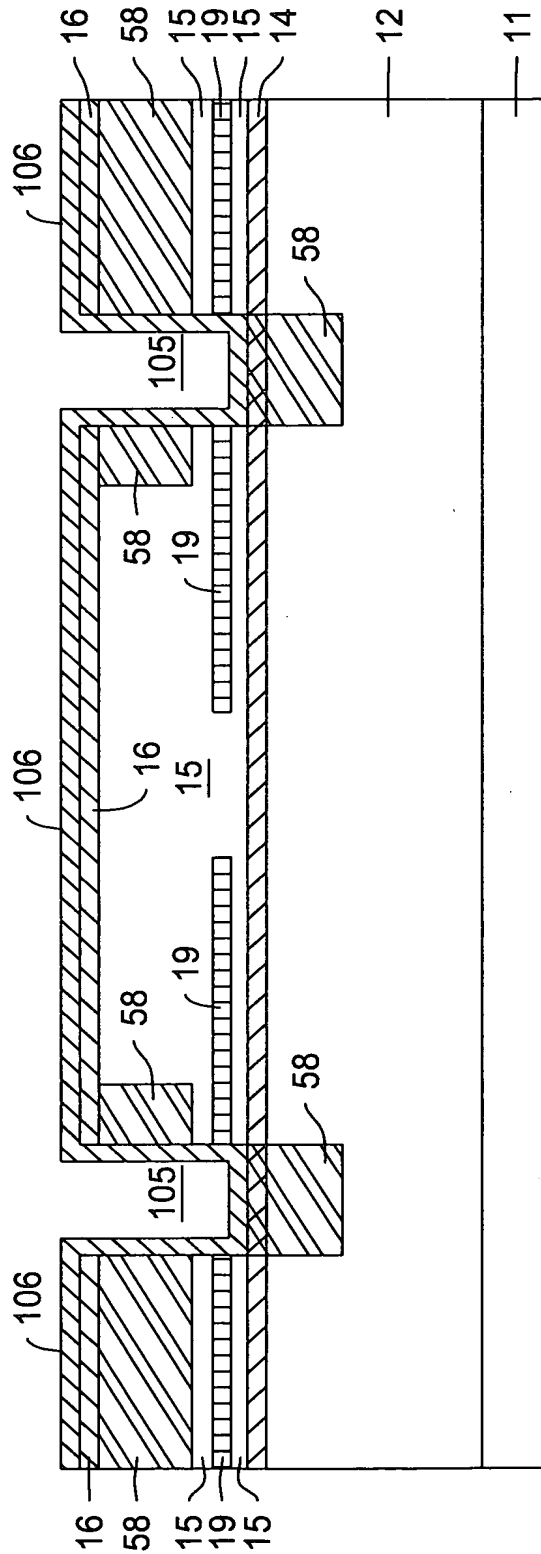


Figure 136

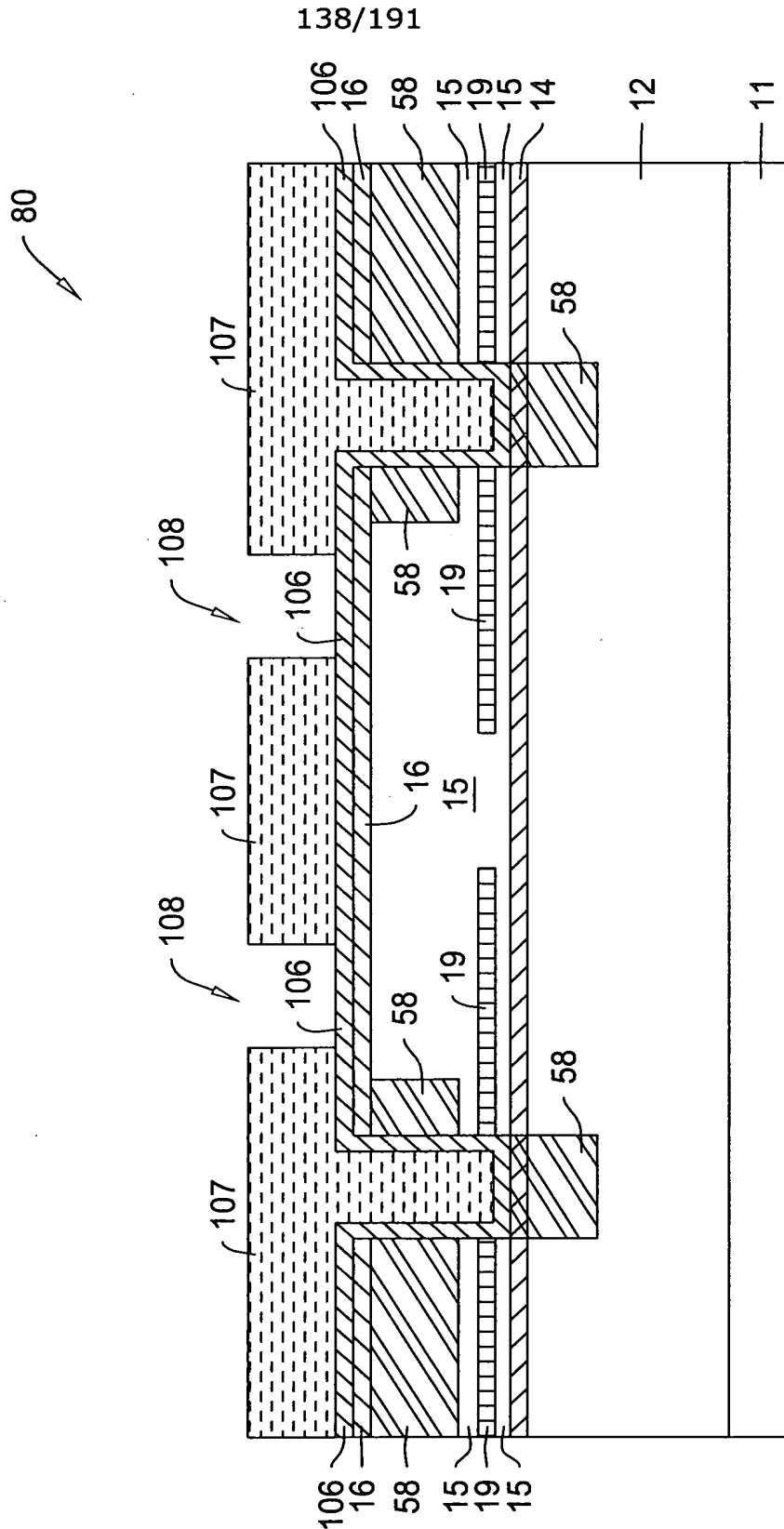
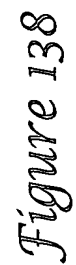


Figure 137



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80

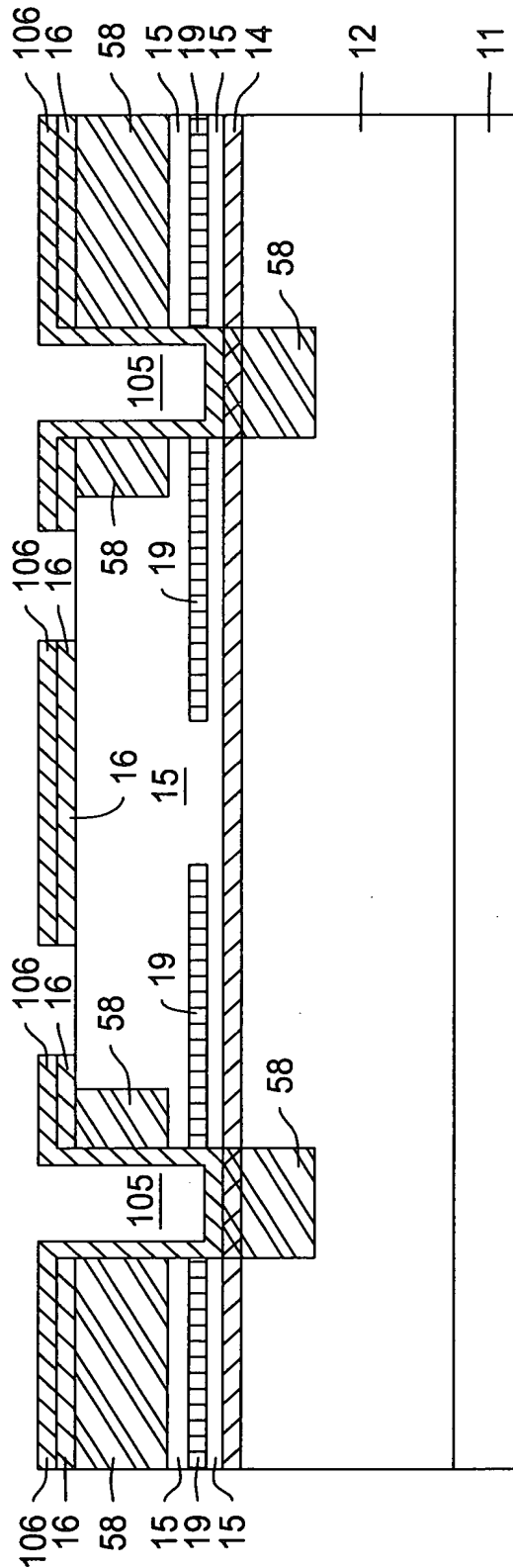


Figure 139

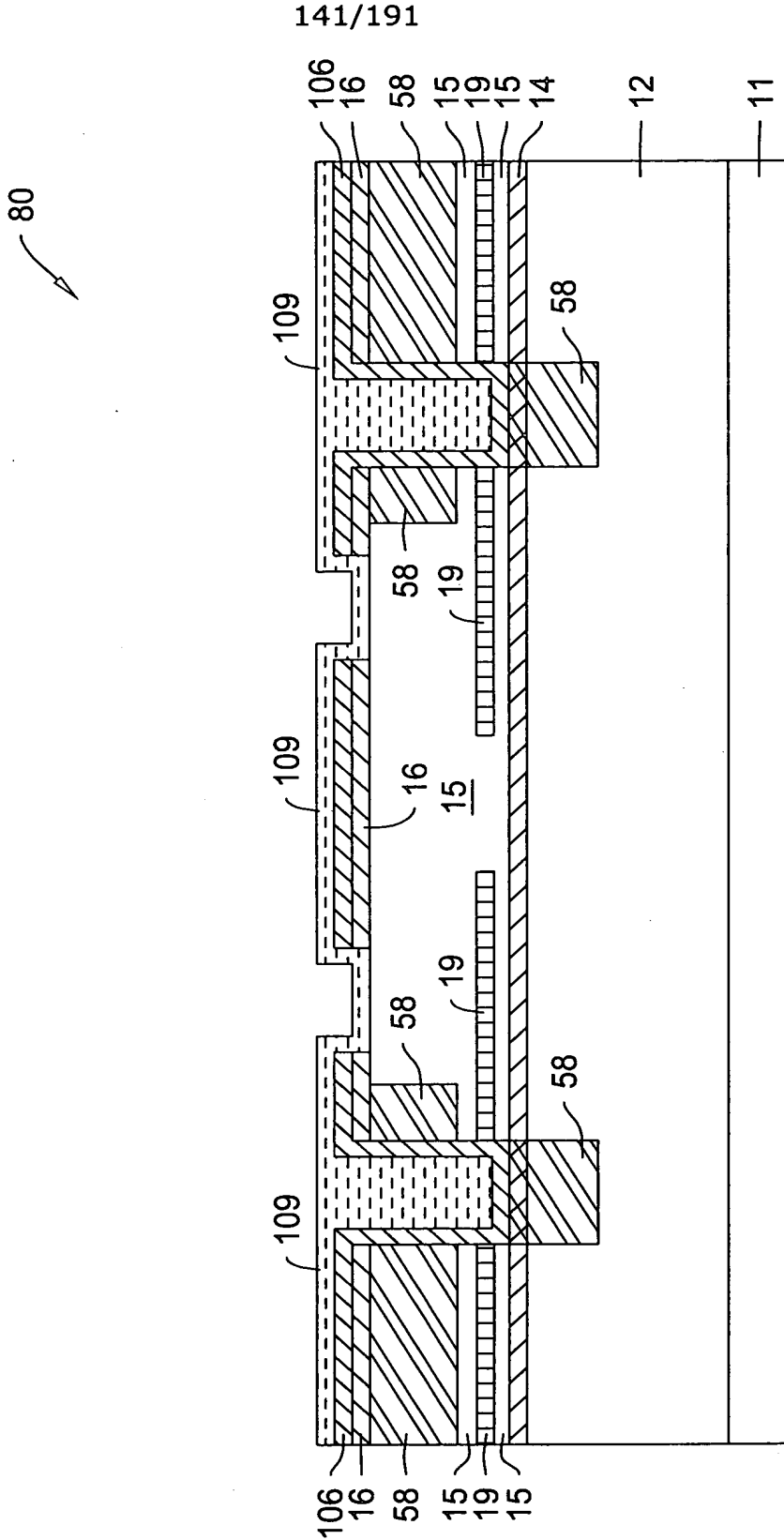
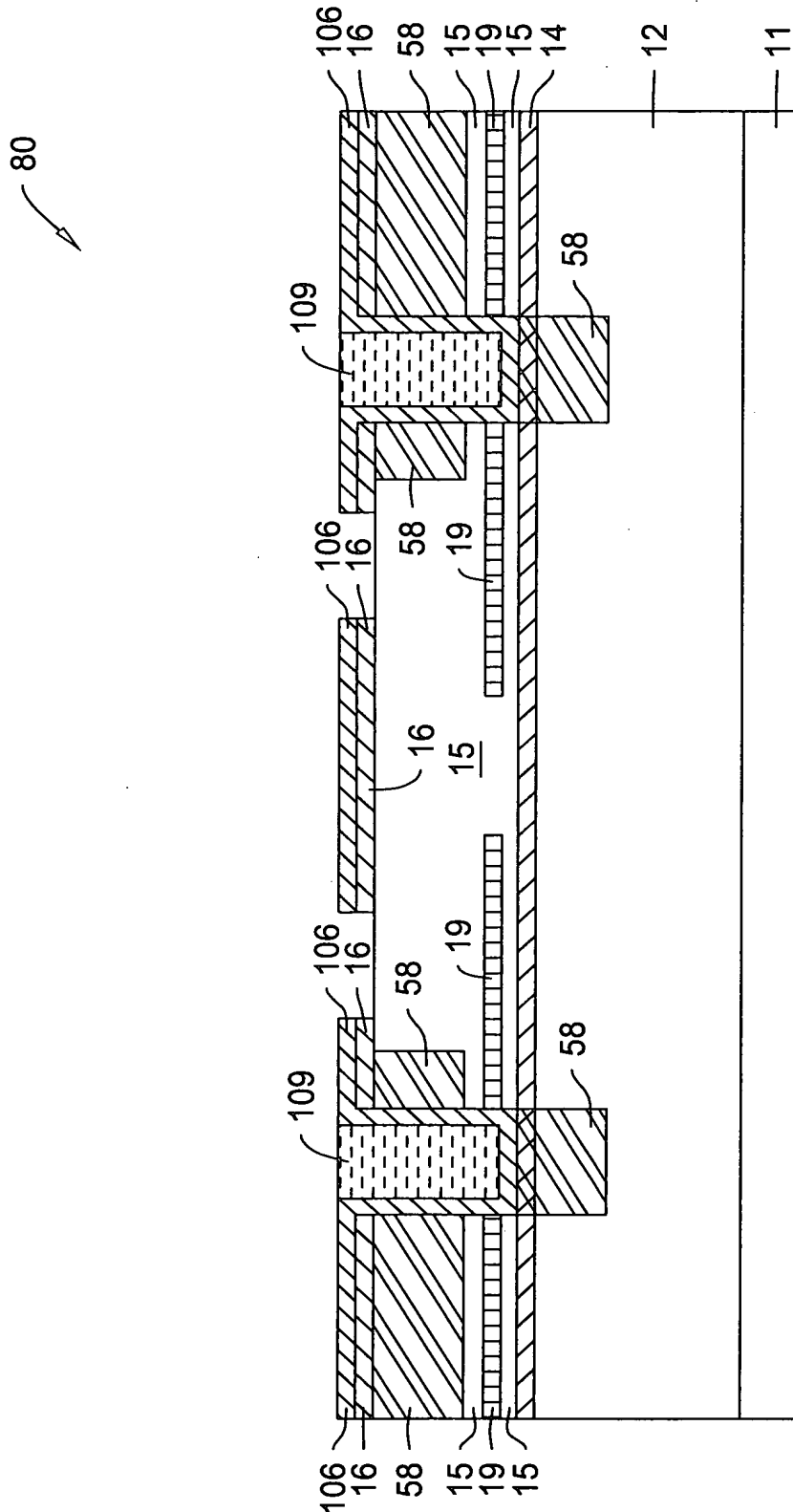


Figure 140



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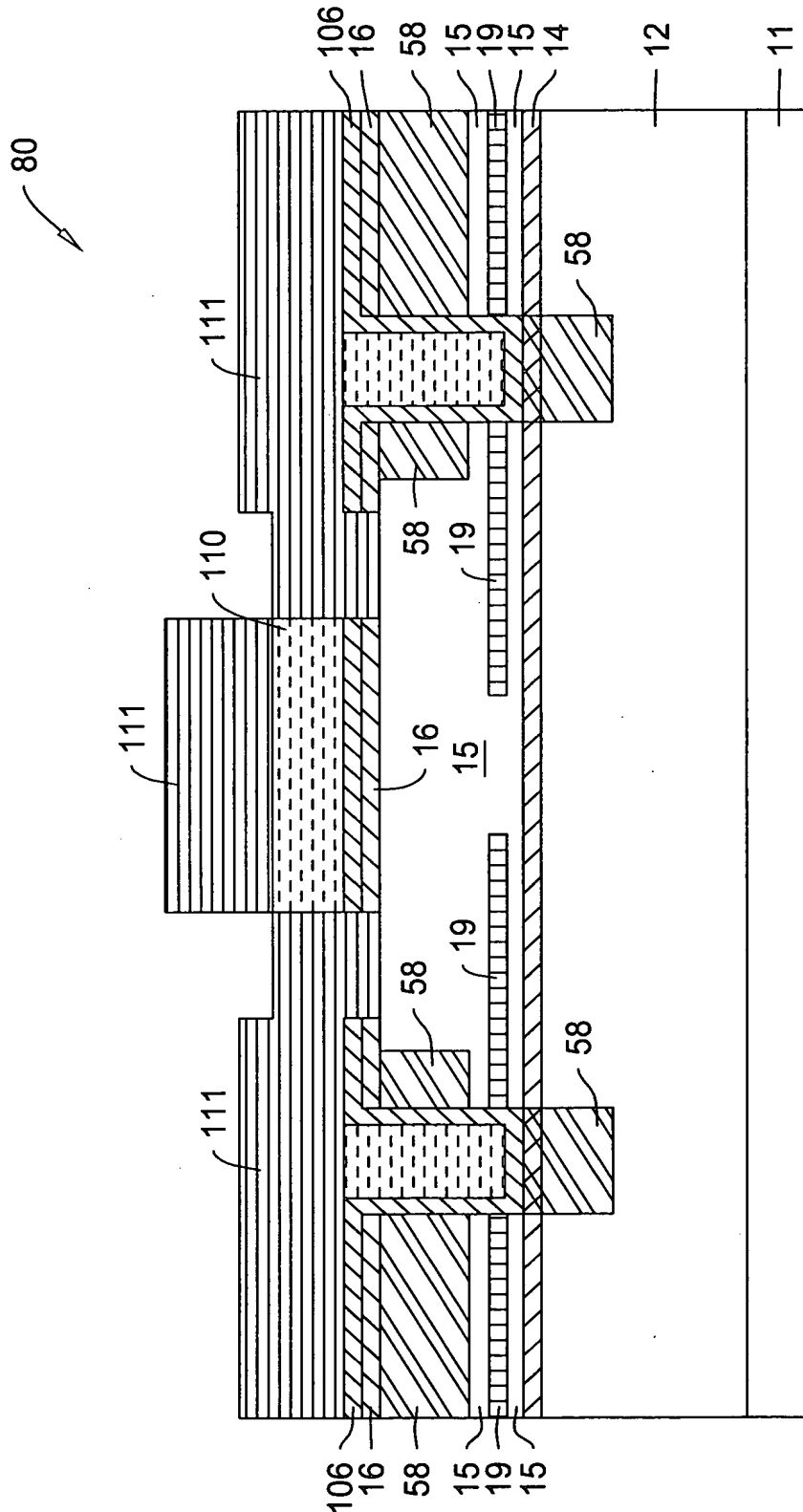


Figure 143

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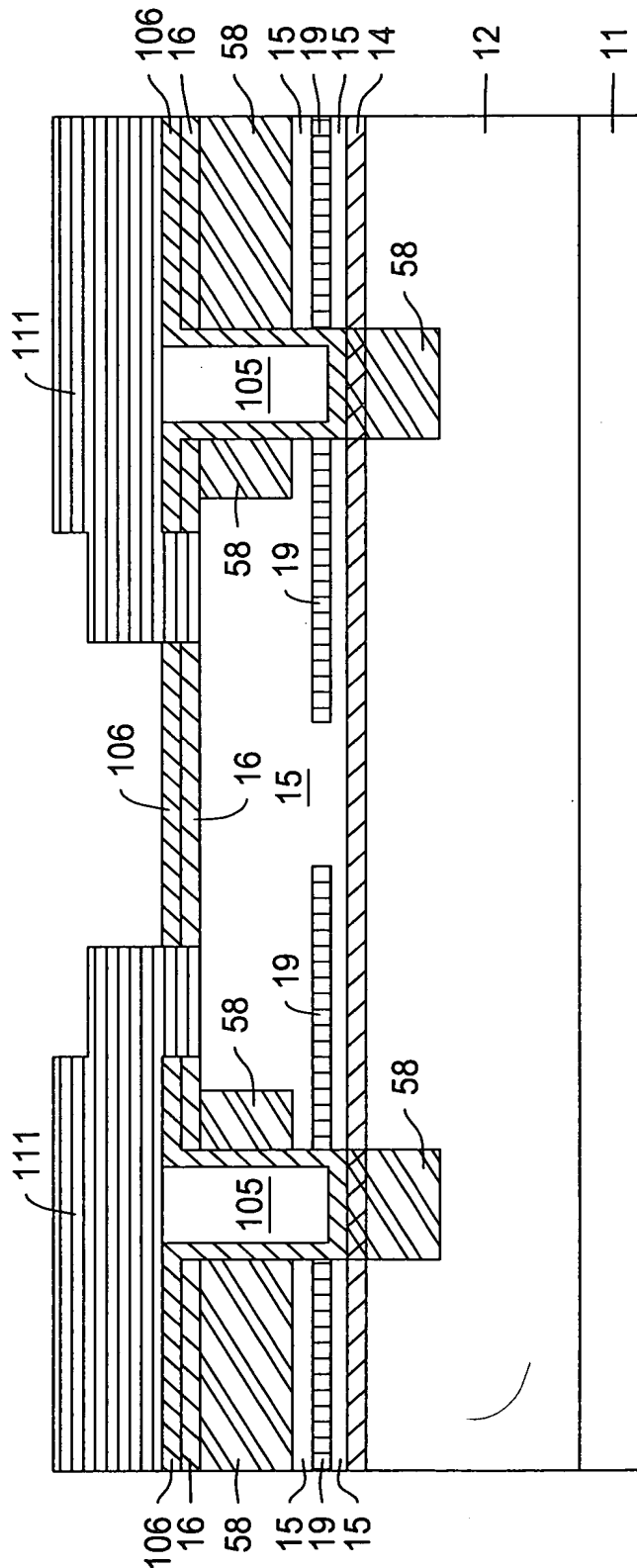


Figure 144

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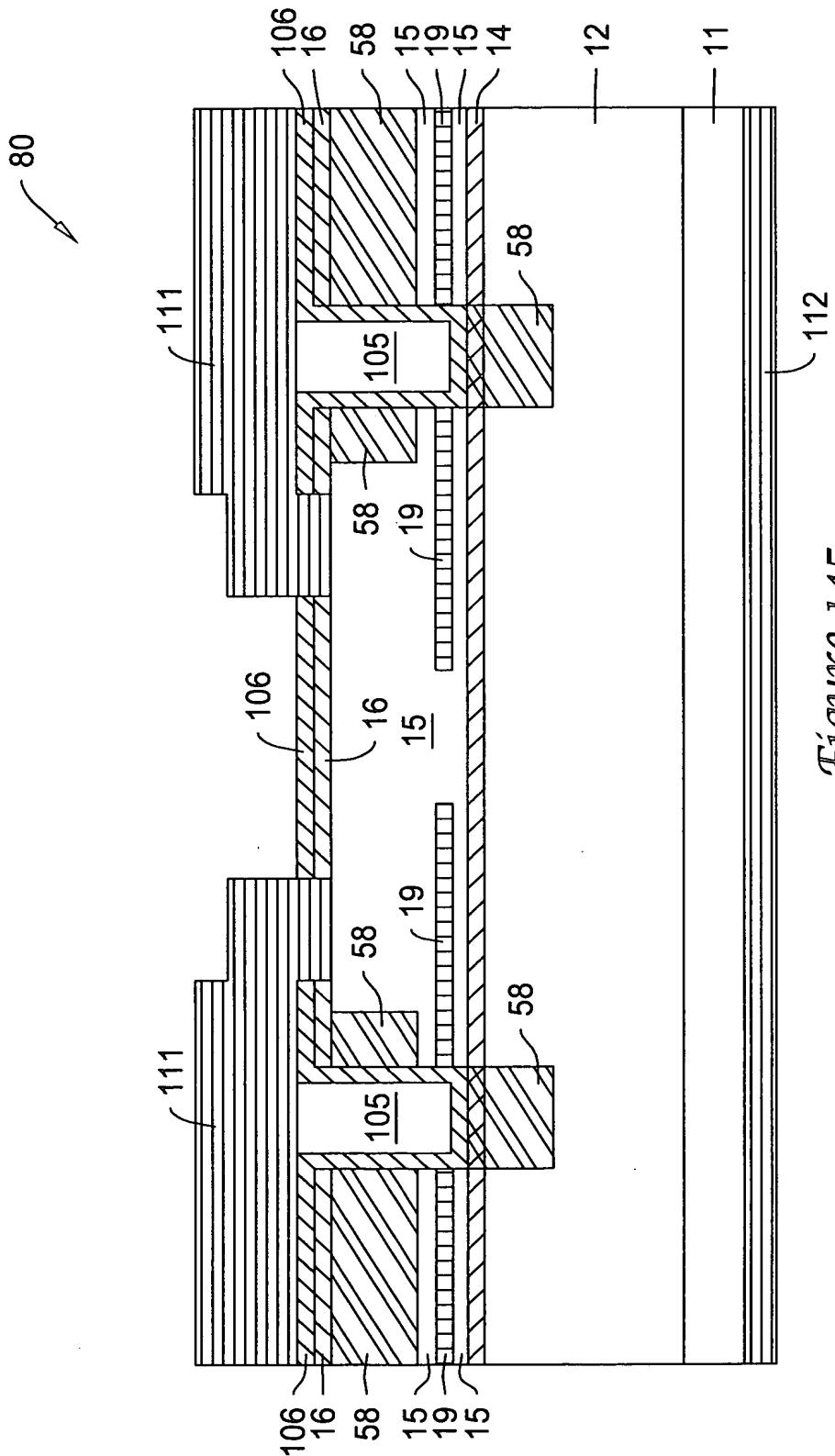


Figure 145

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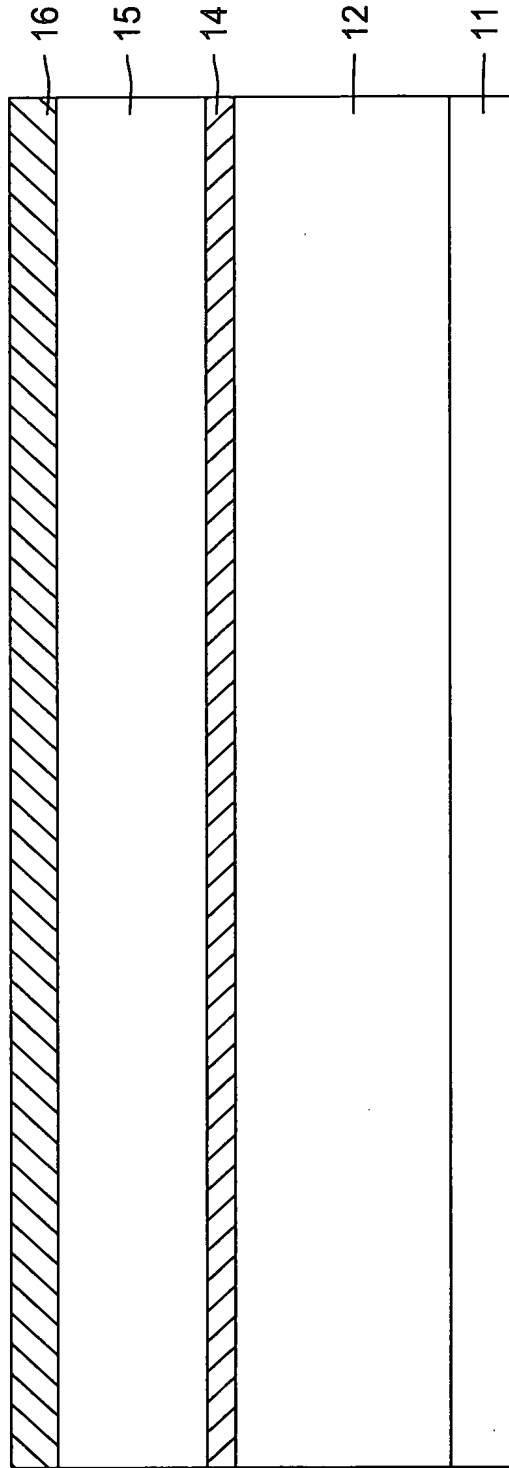


Figure 146

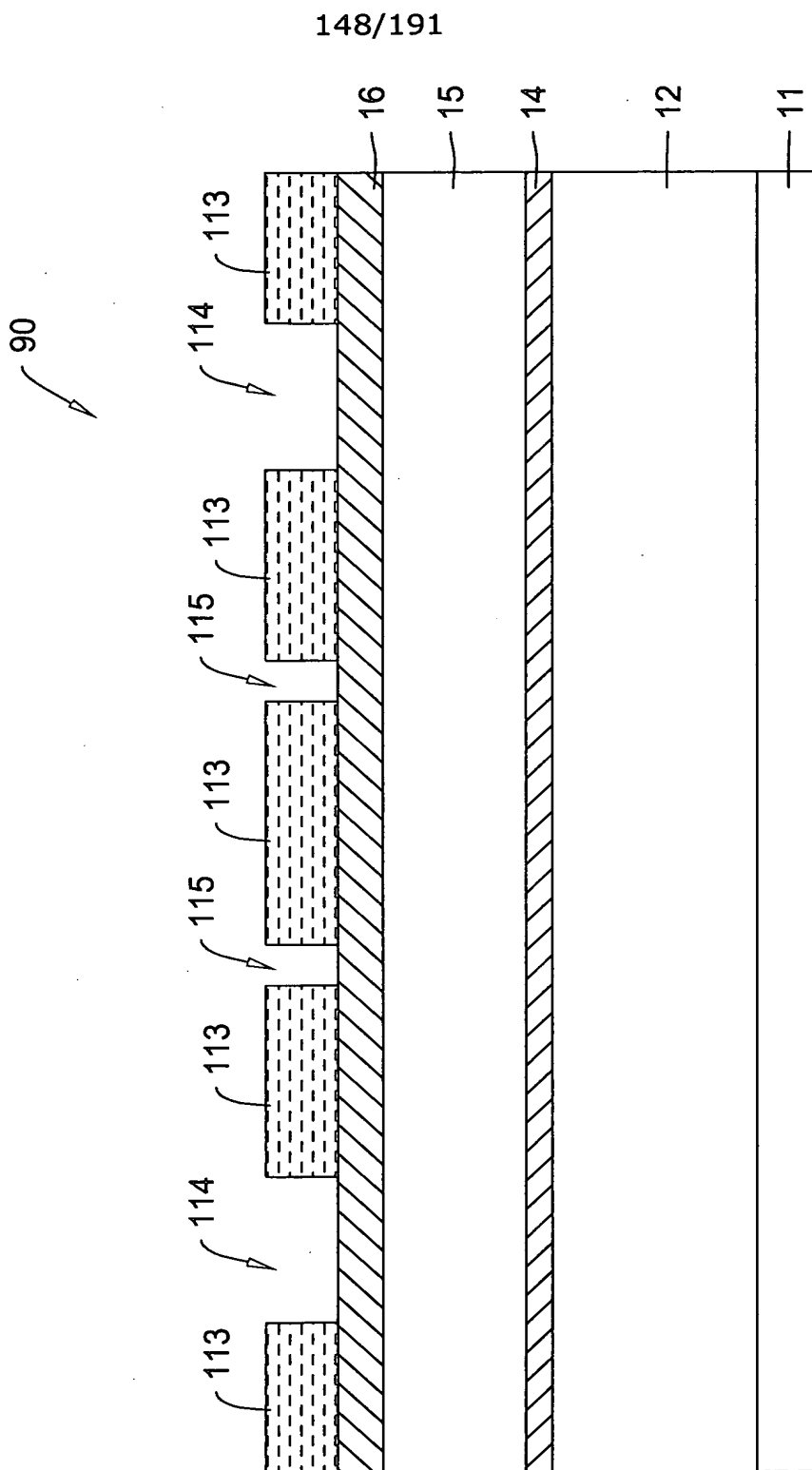


Figure 147

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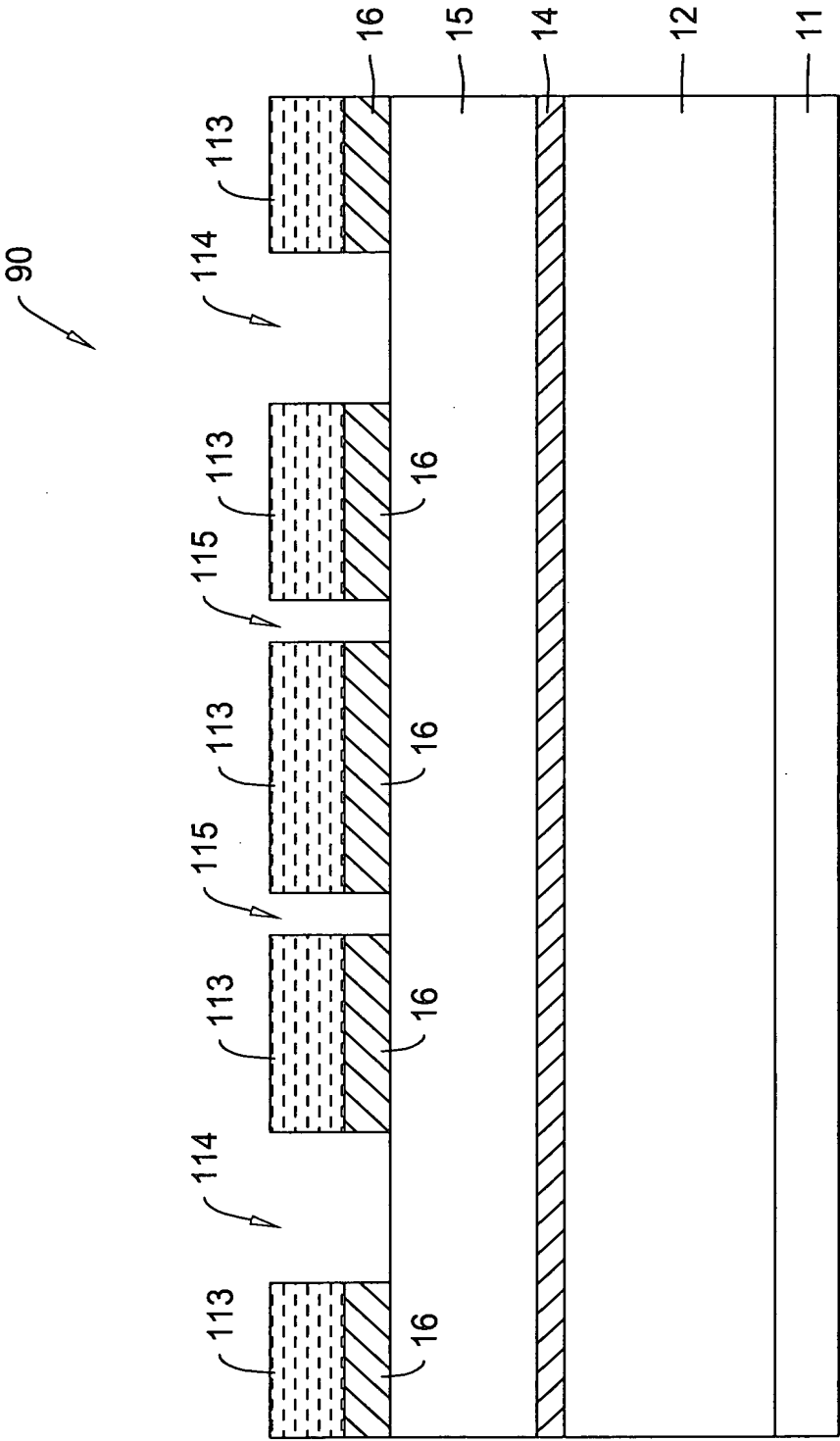
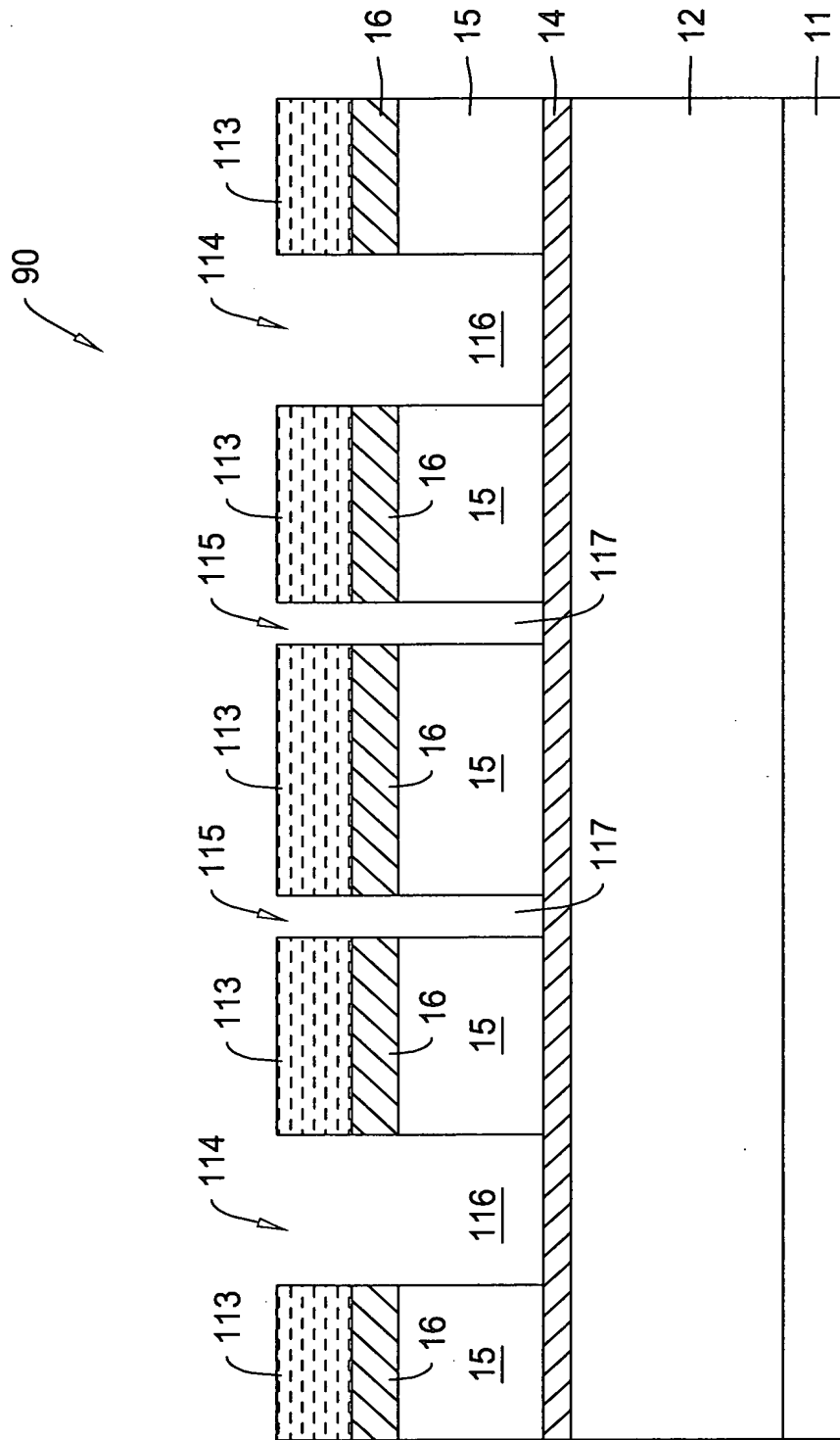


Figure 148



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90

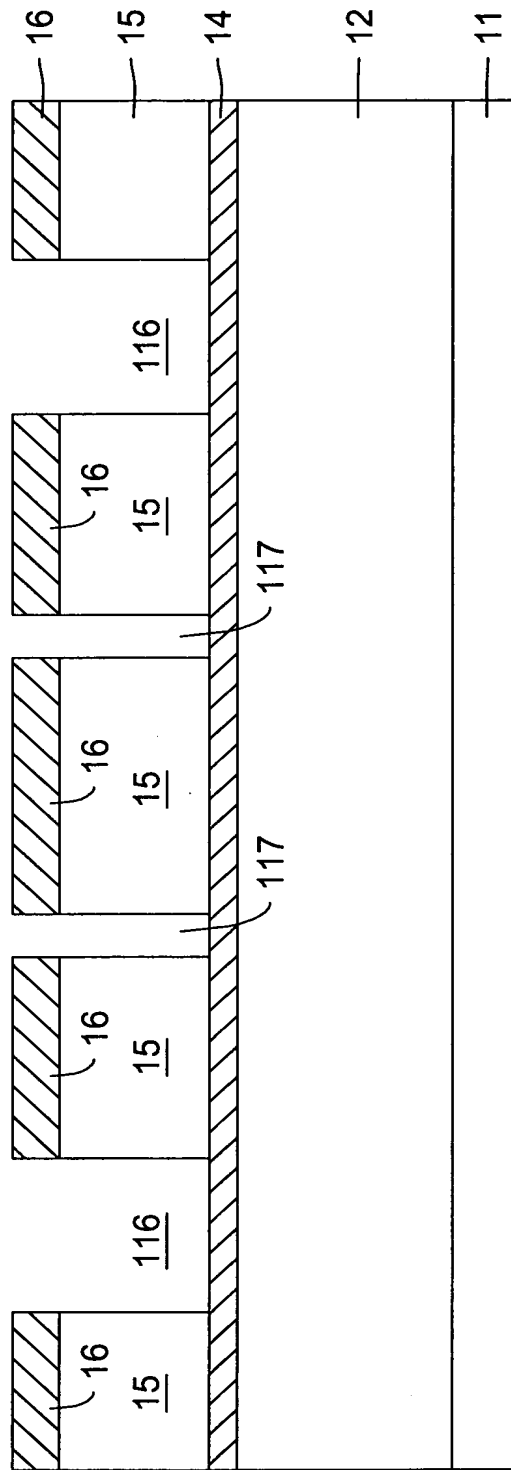


Figure 150

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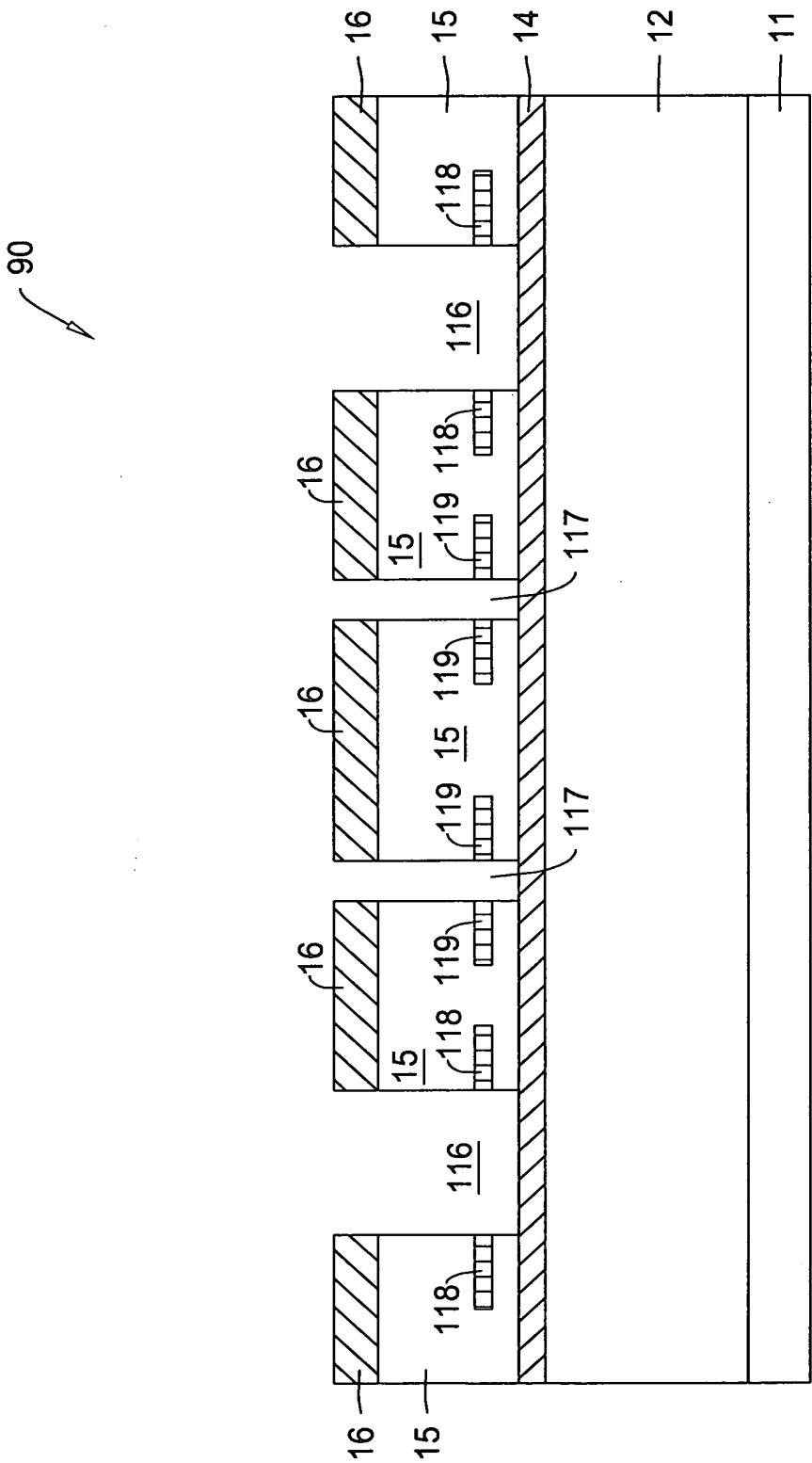


Figure 151

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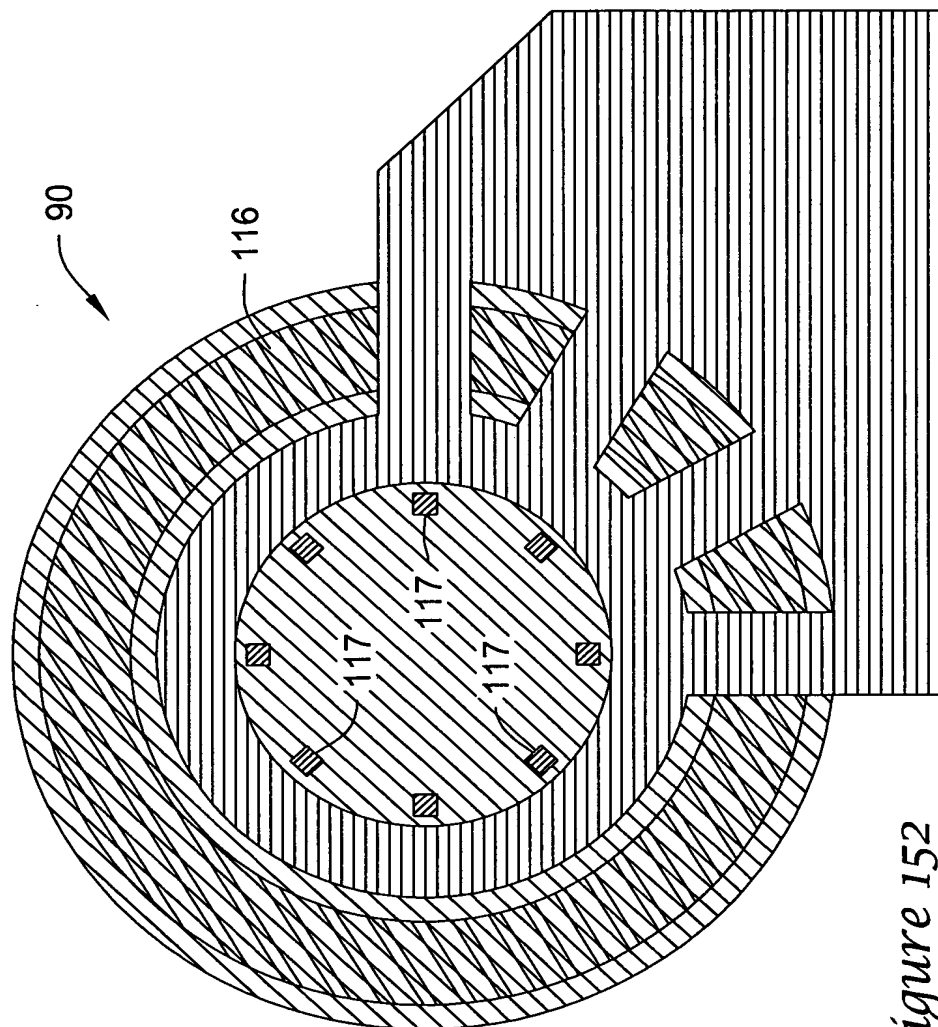


Figure 152

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90

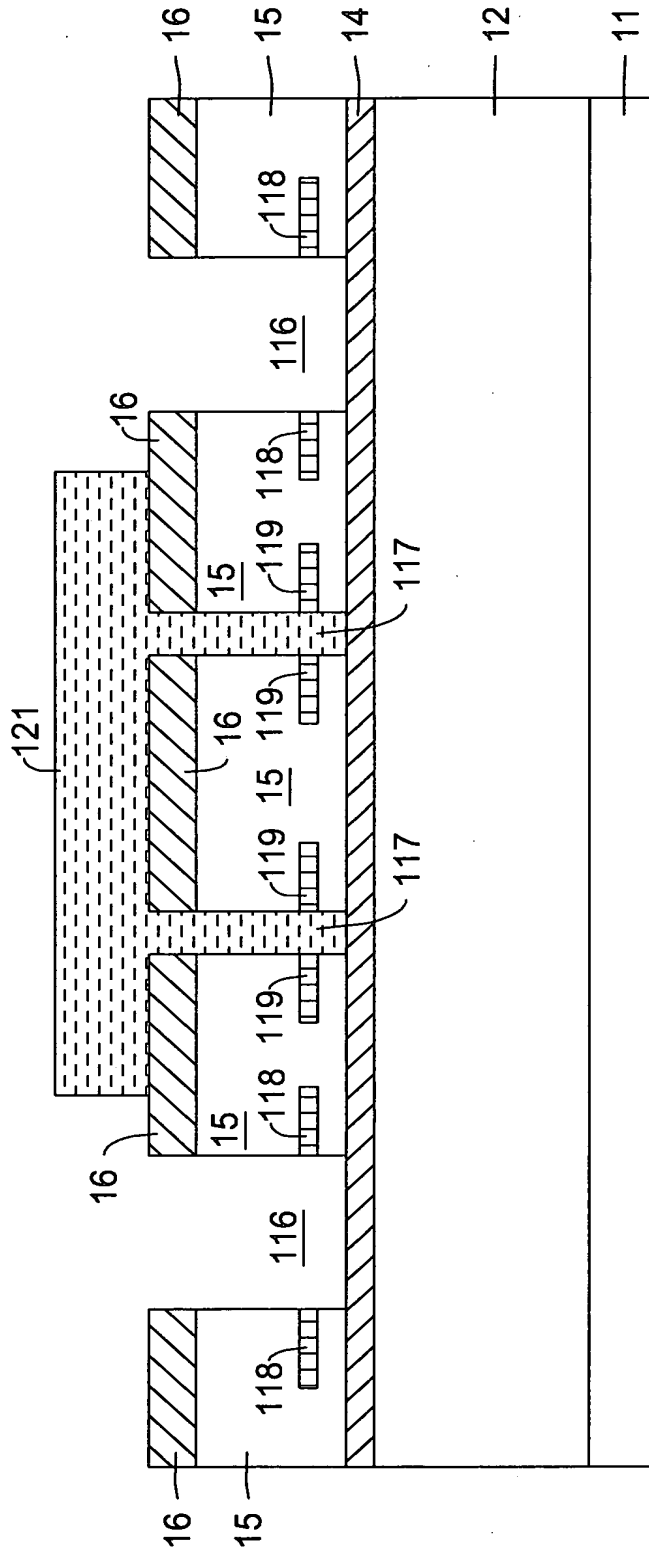


Figure 153

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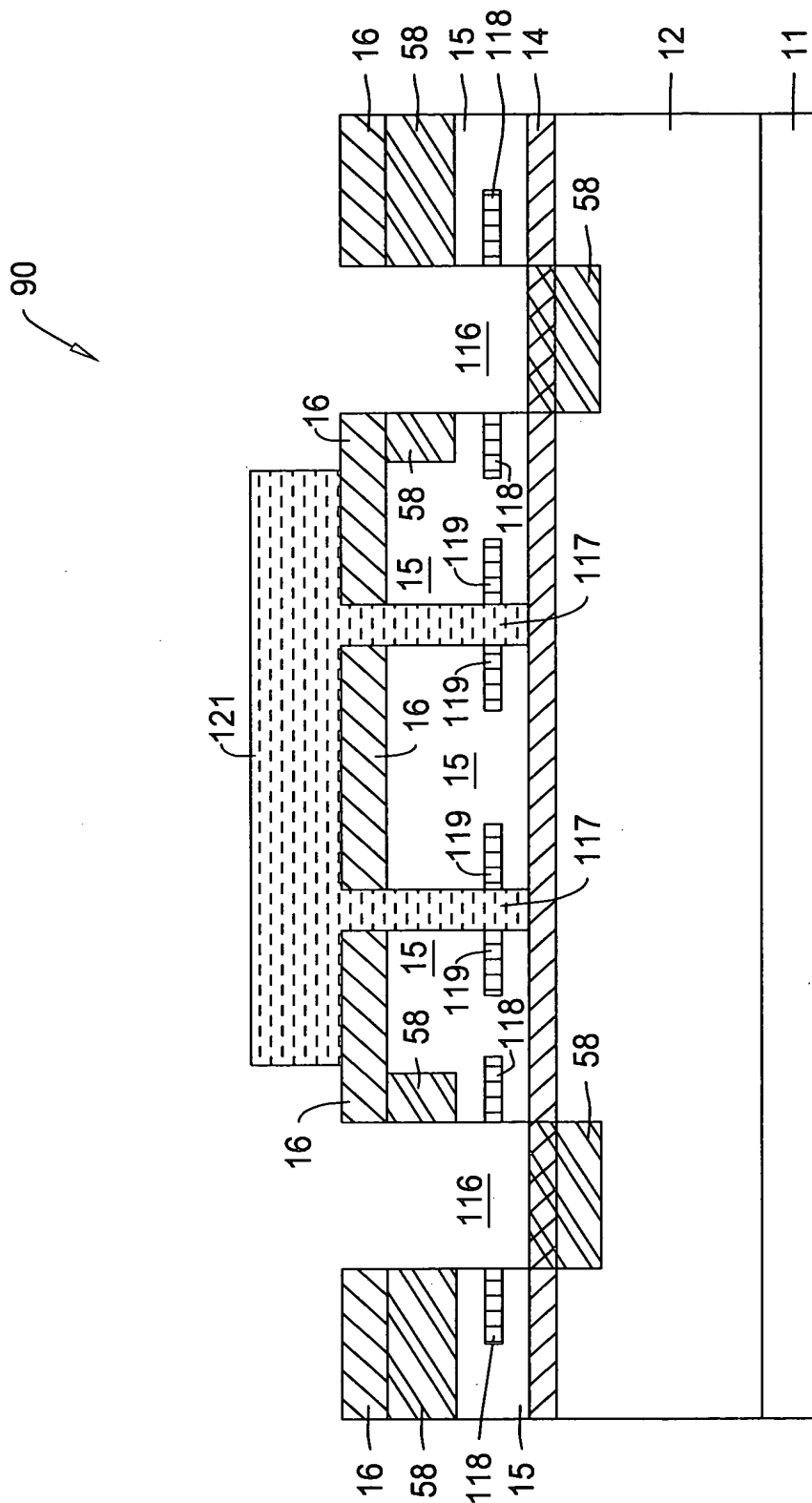


Figure 154

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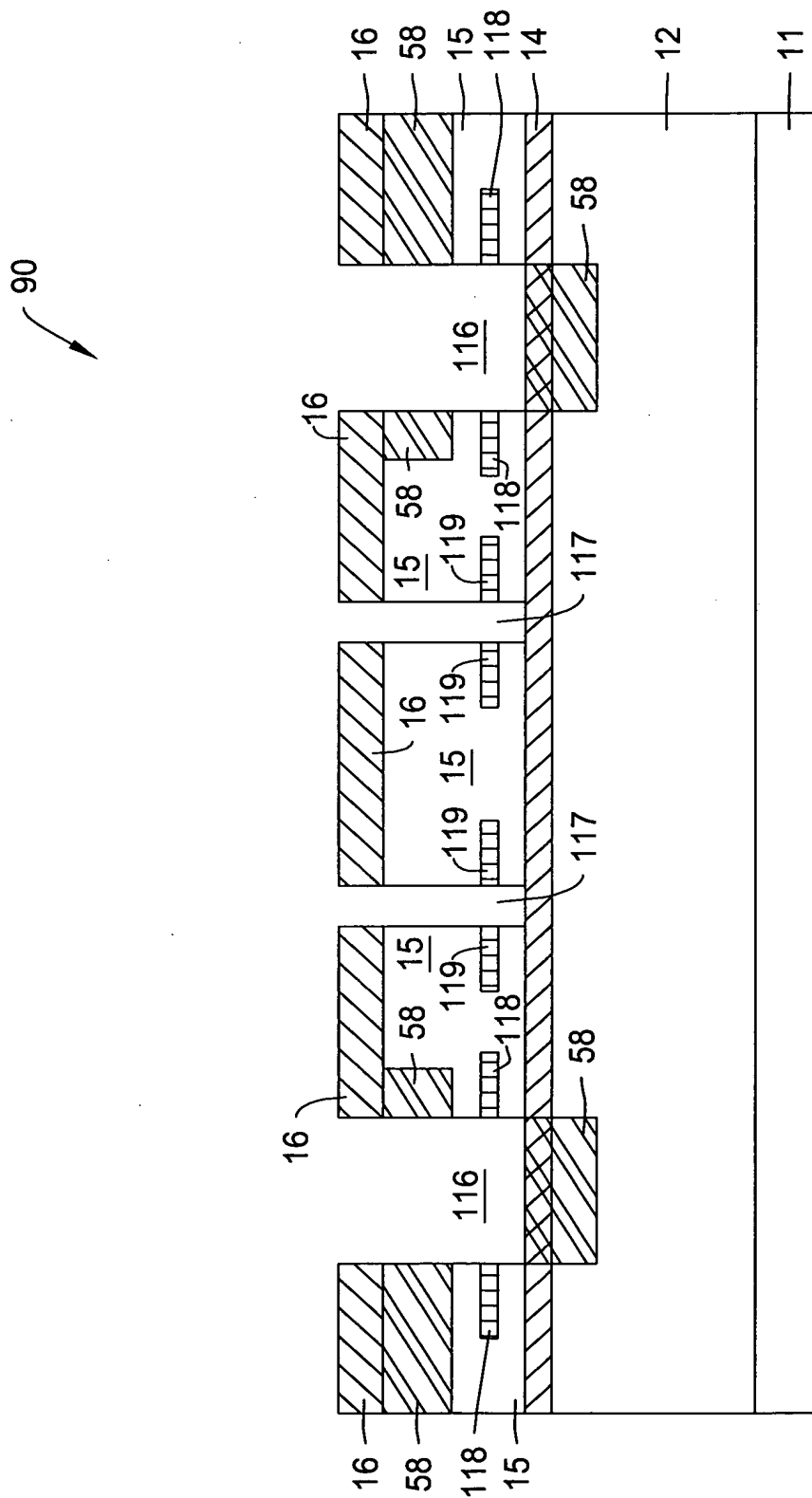


Figure 155

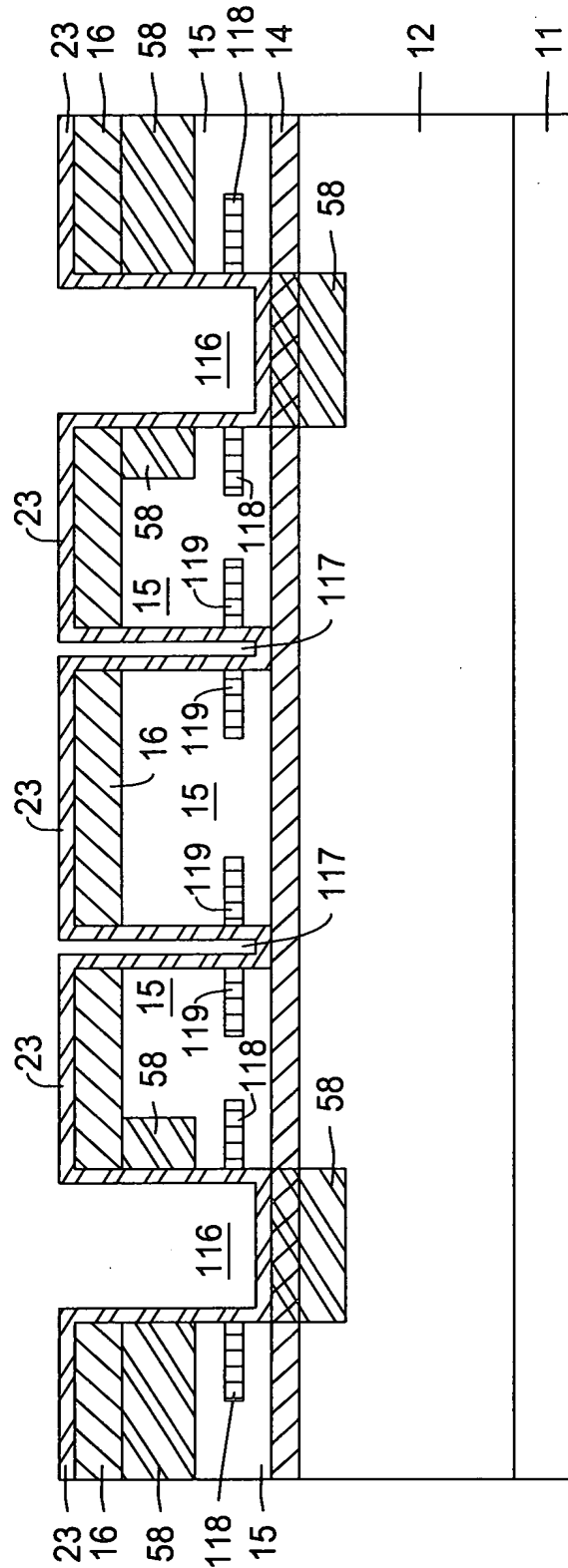
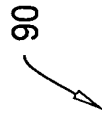


Figure 156

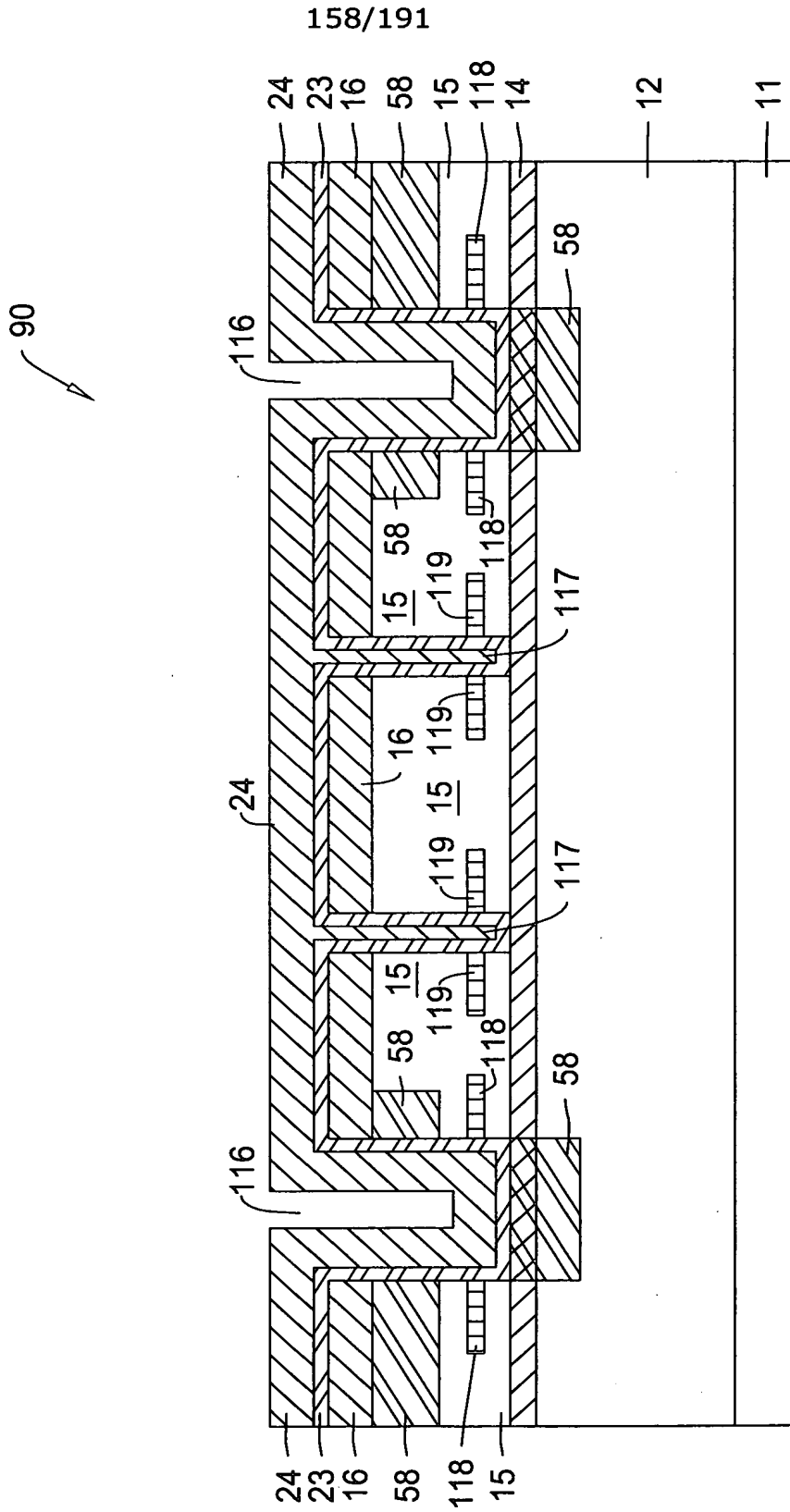


Figure 157

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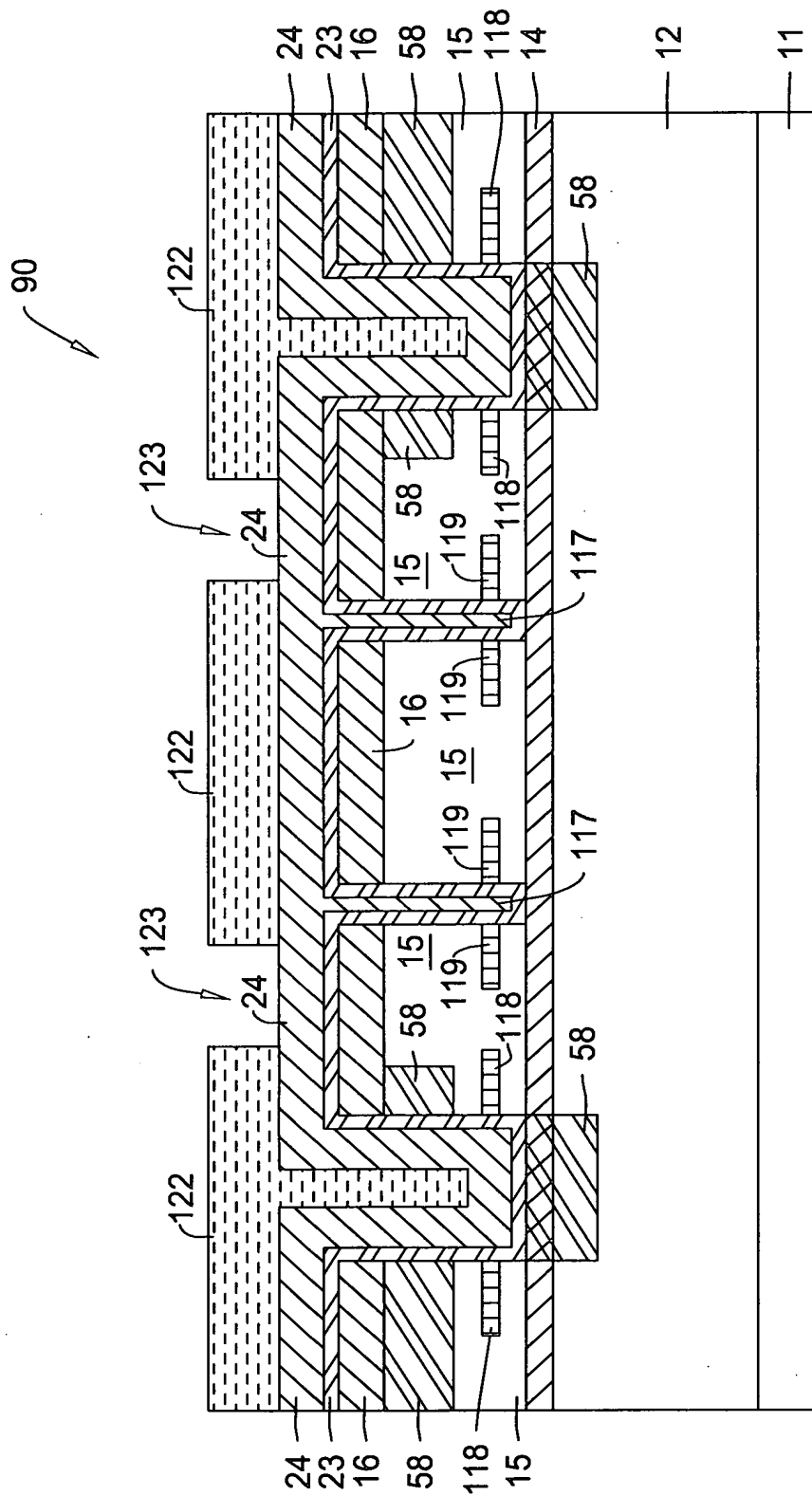
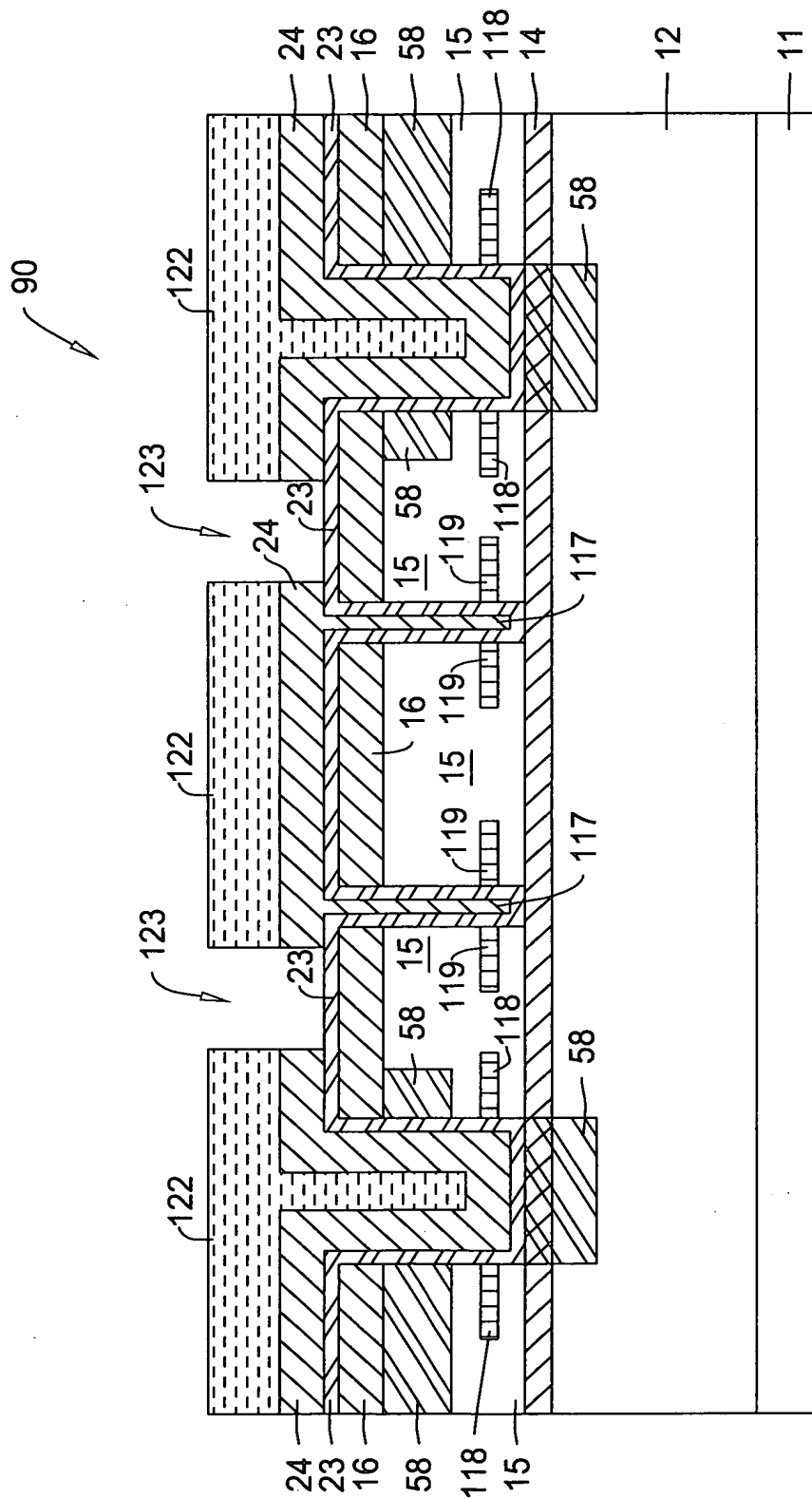


Figure 158



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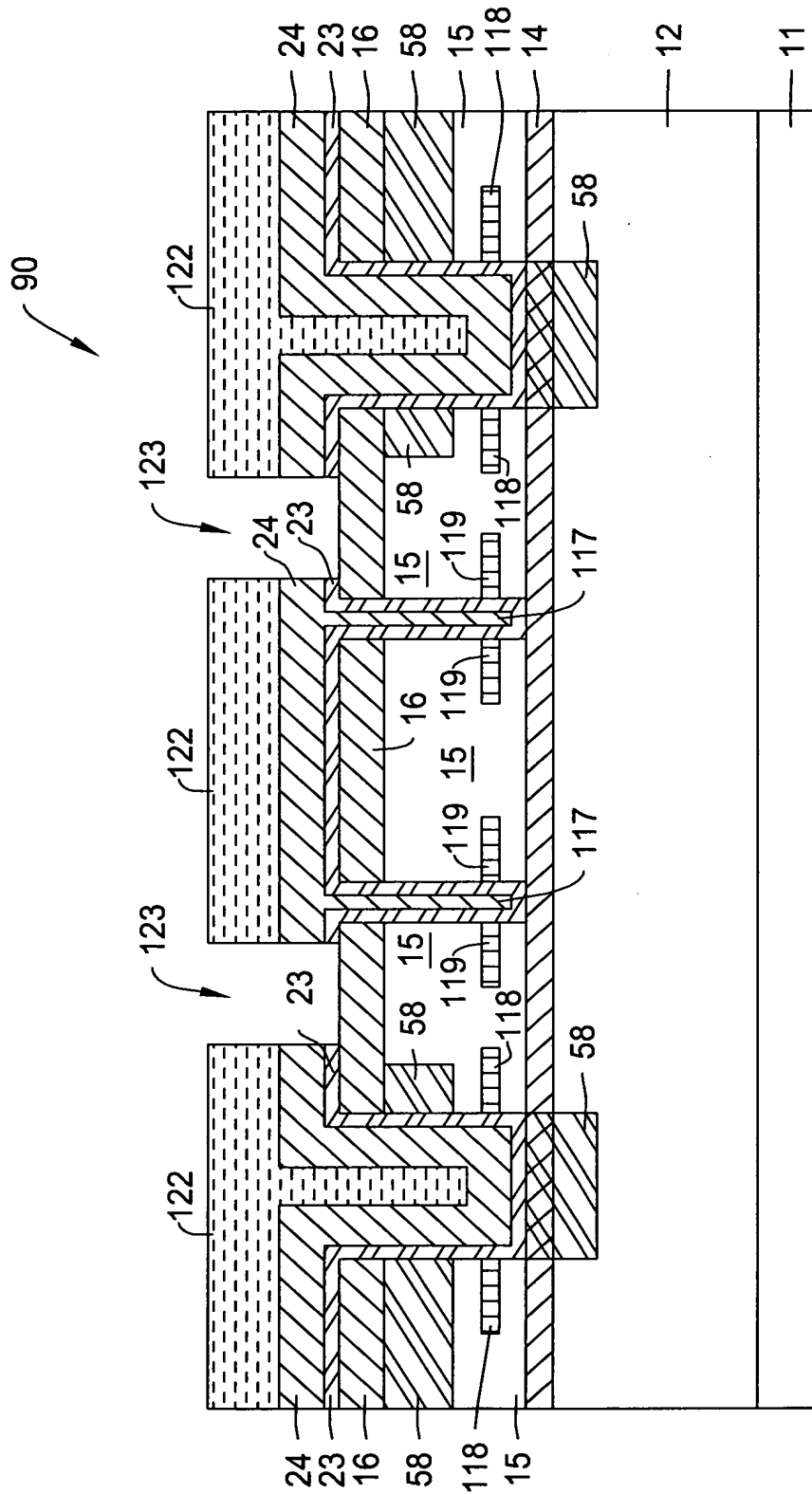


Figure 160

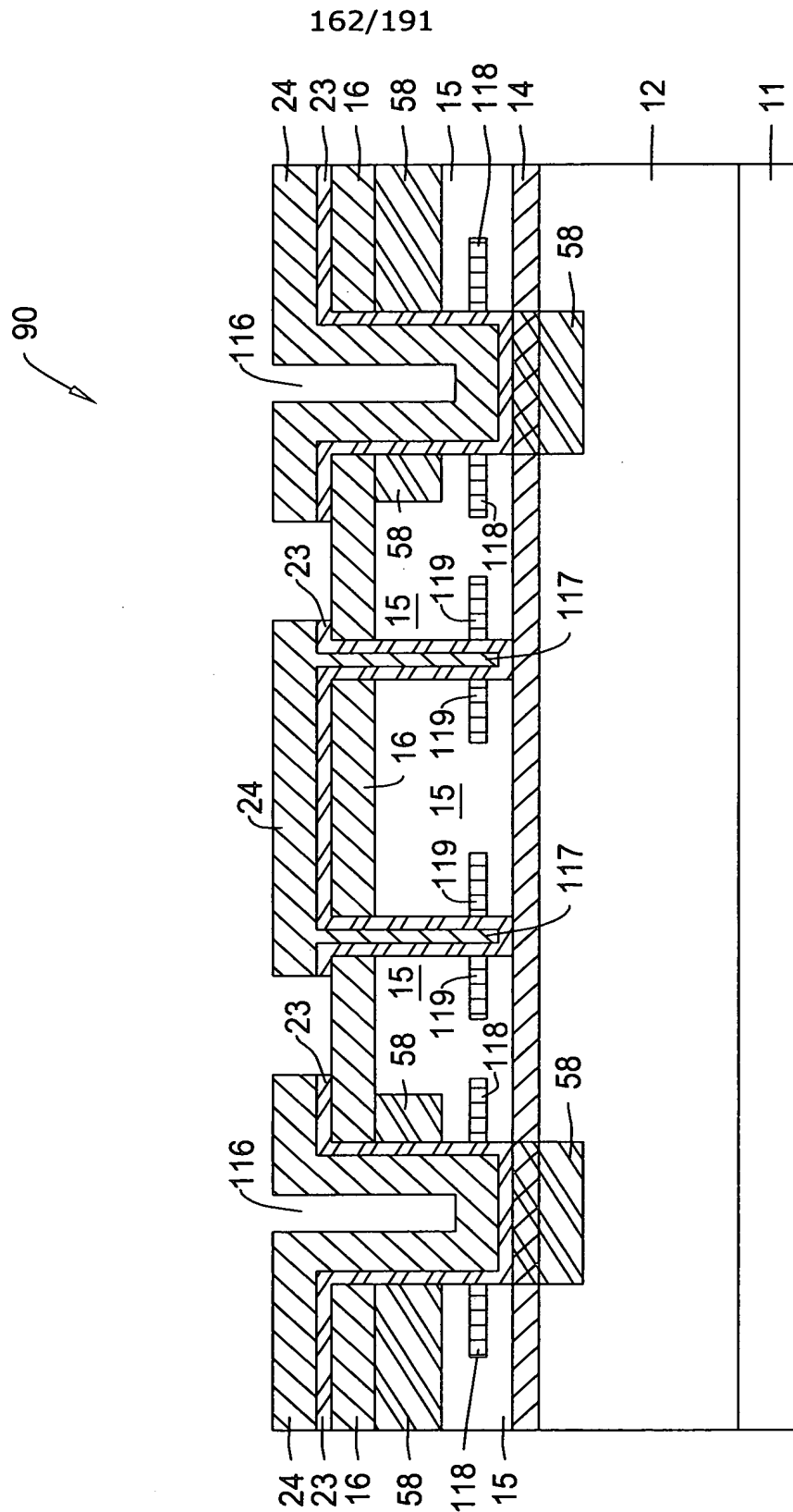
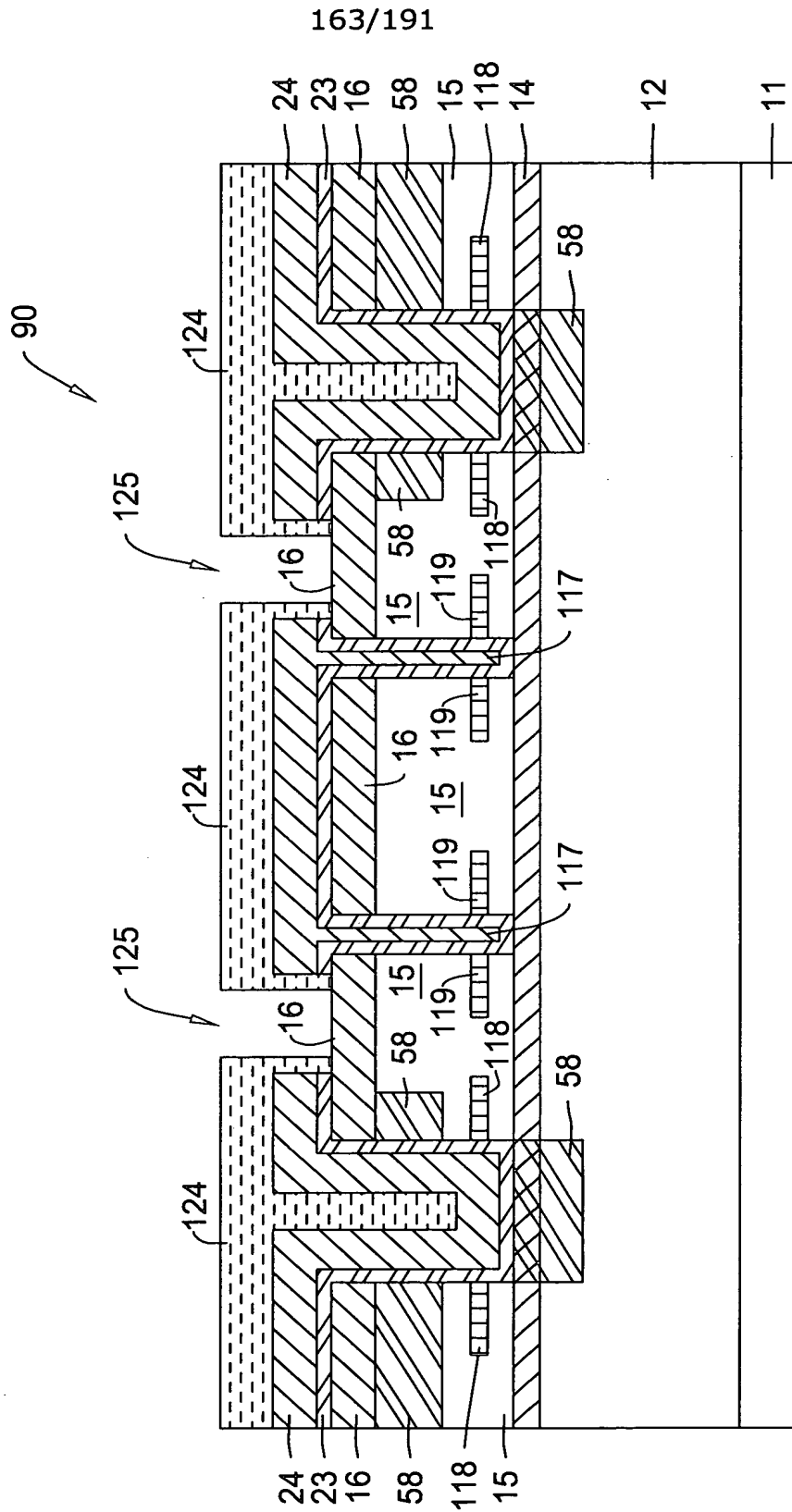


Figure 161



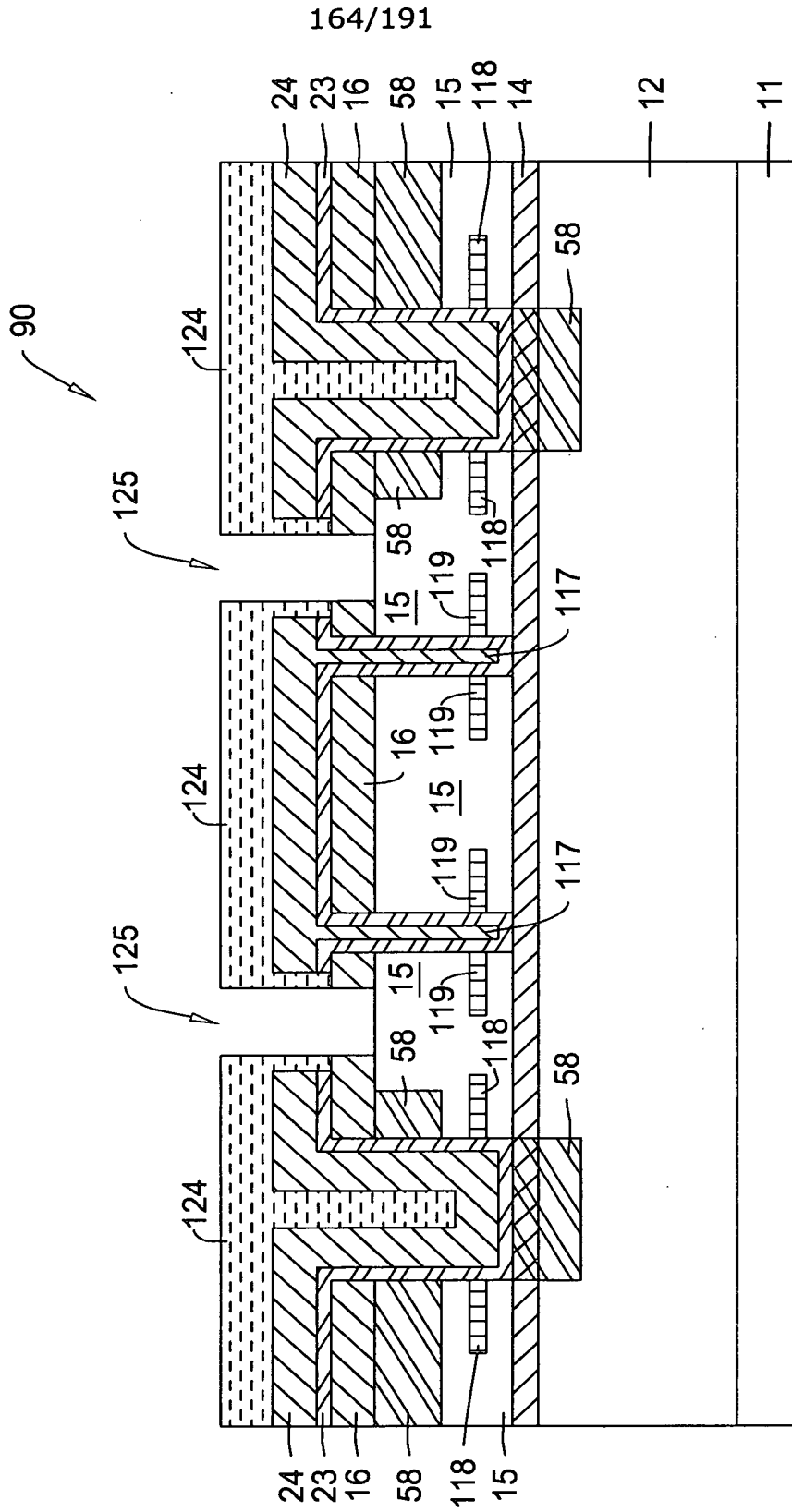


Figure 163

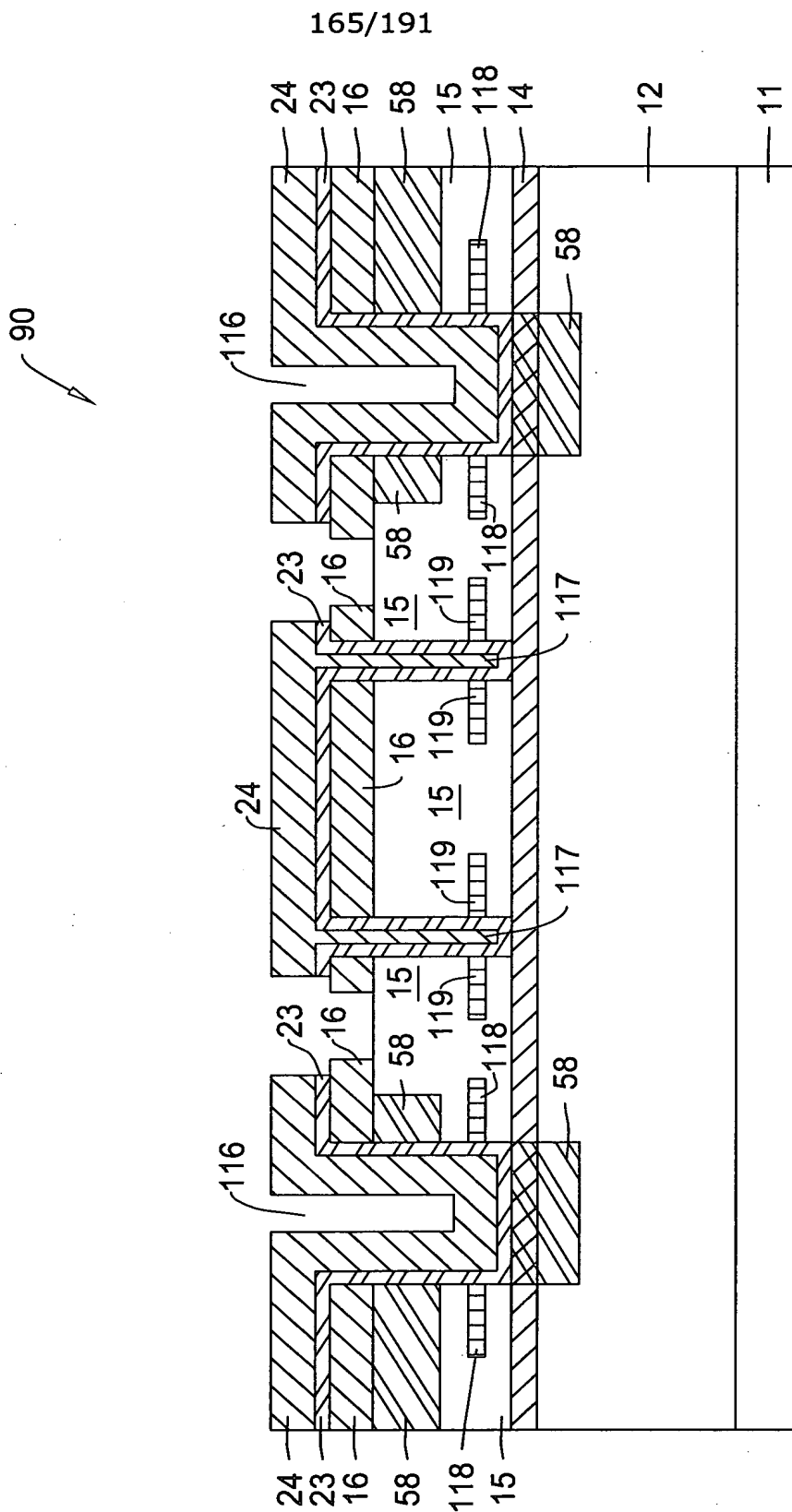


Figure 164

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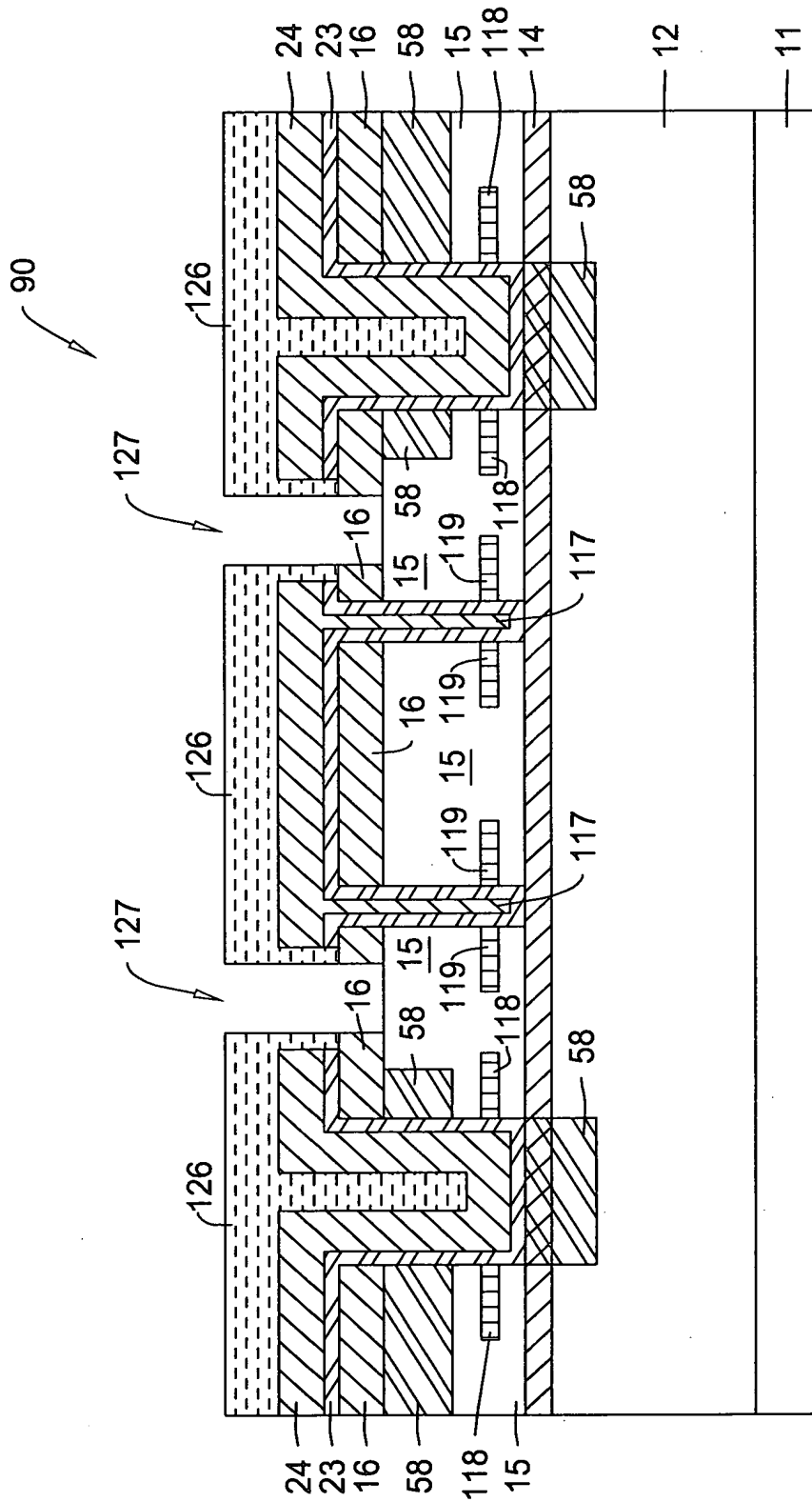


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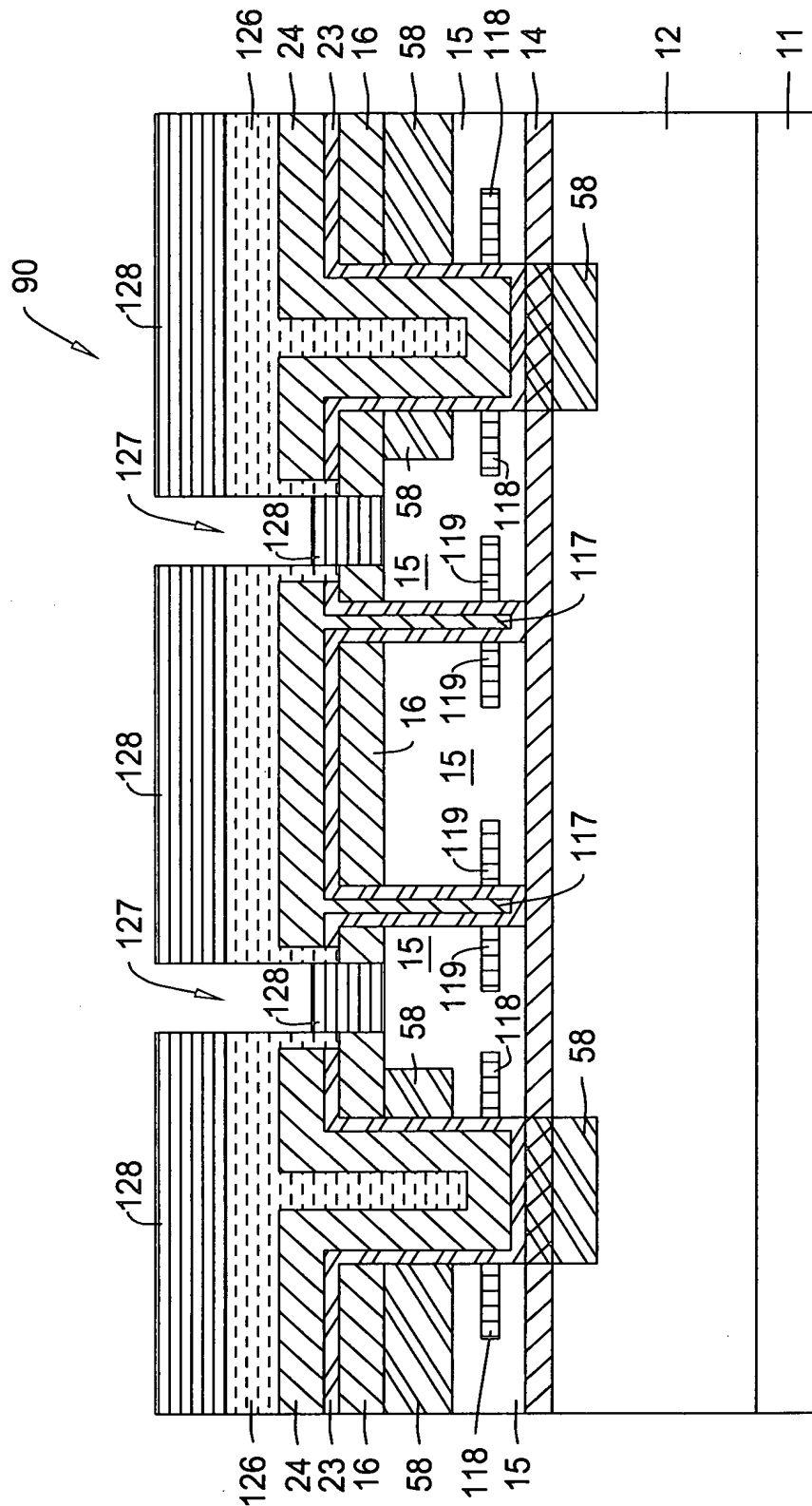


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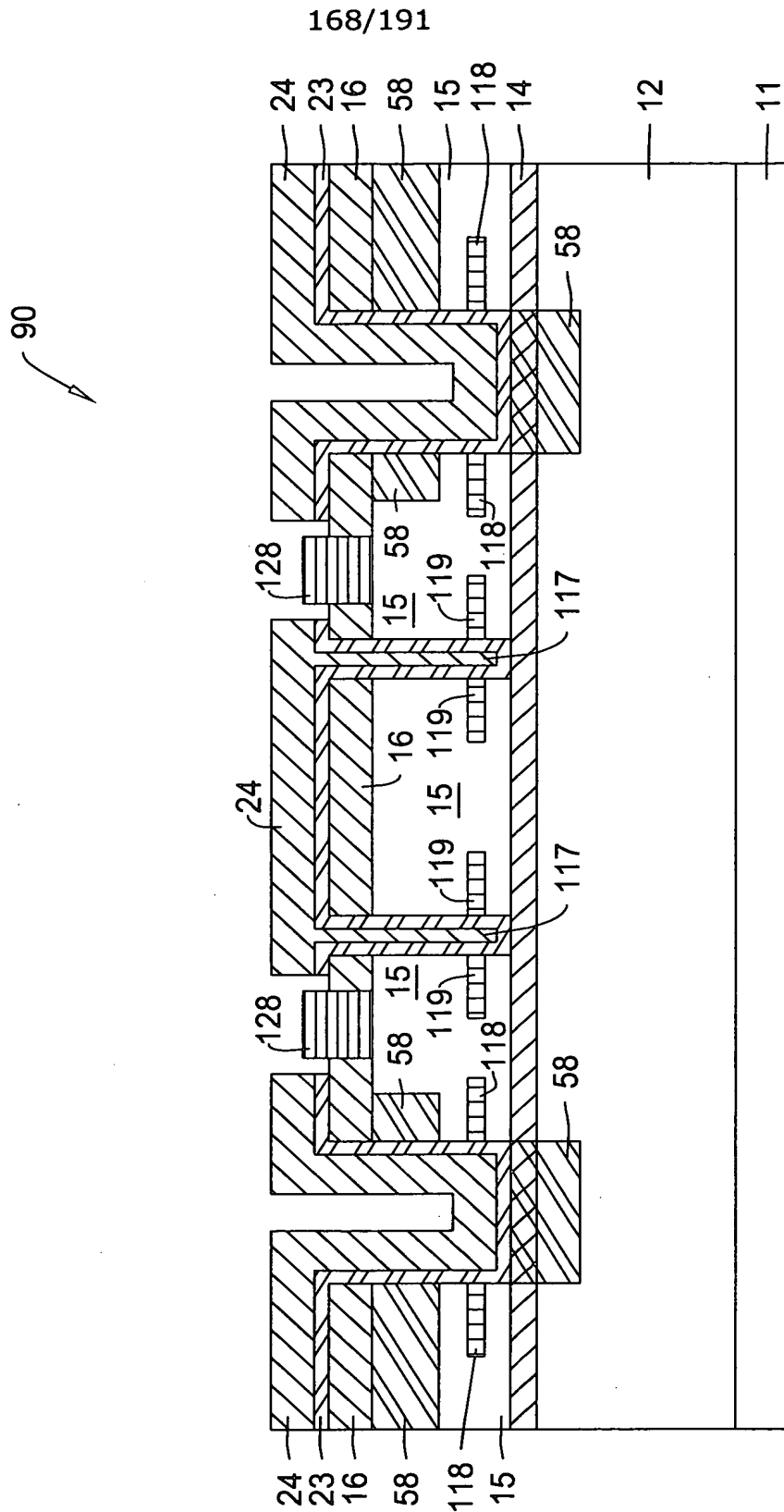


Figure 167

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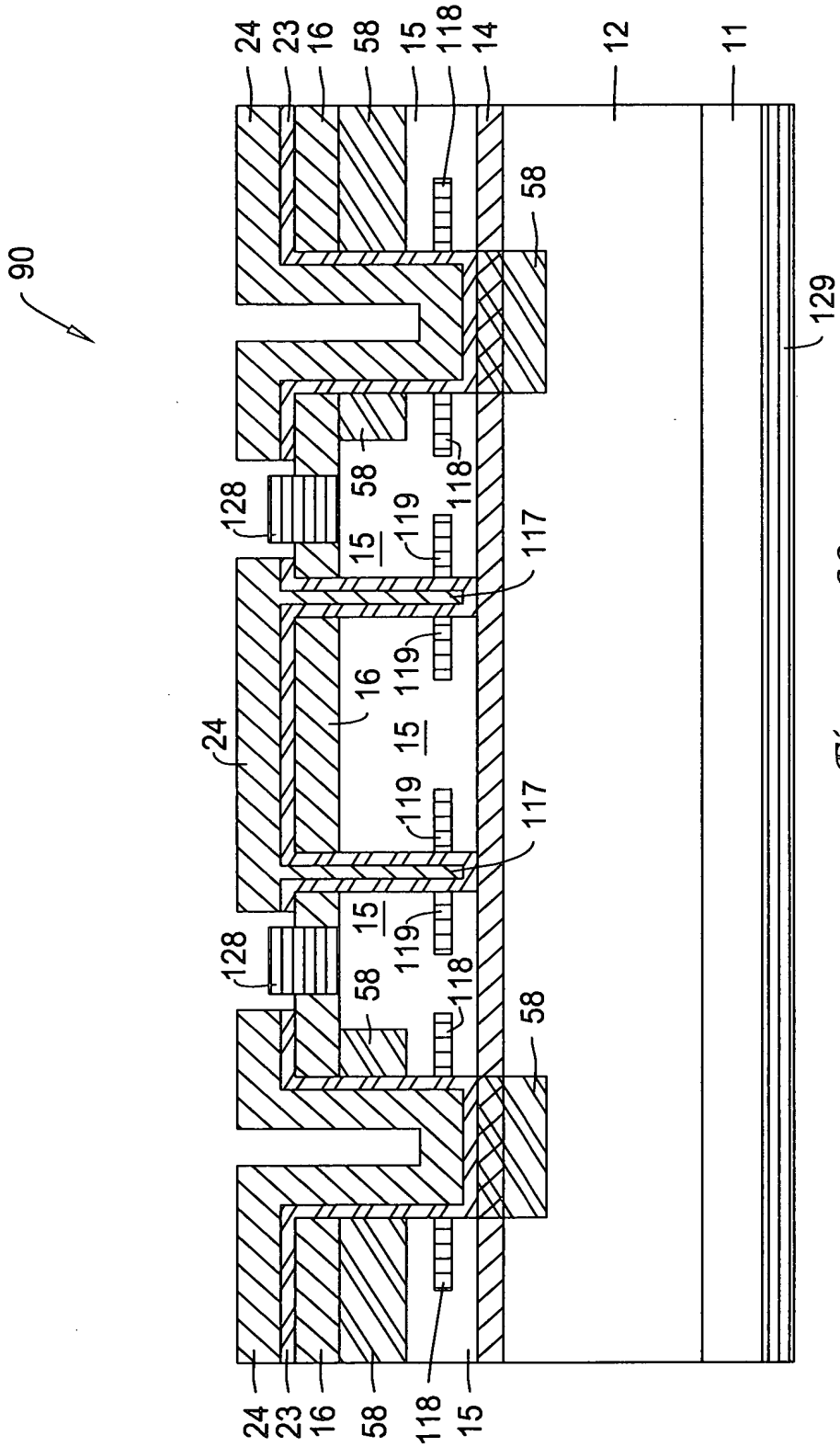


Figure 168

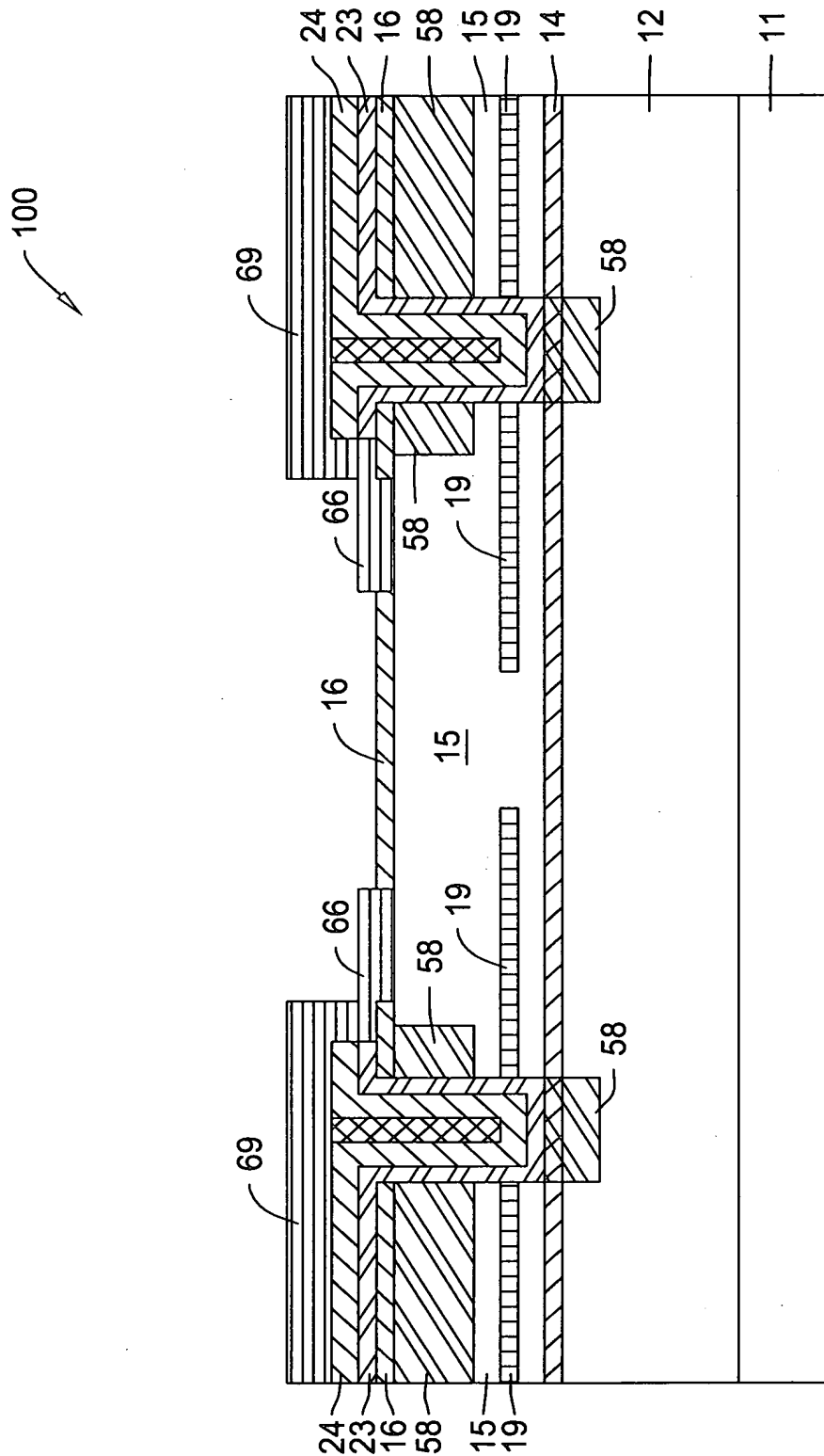


Figure 169

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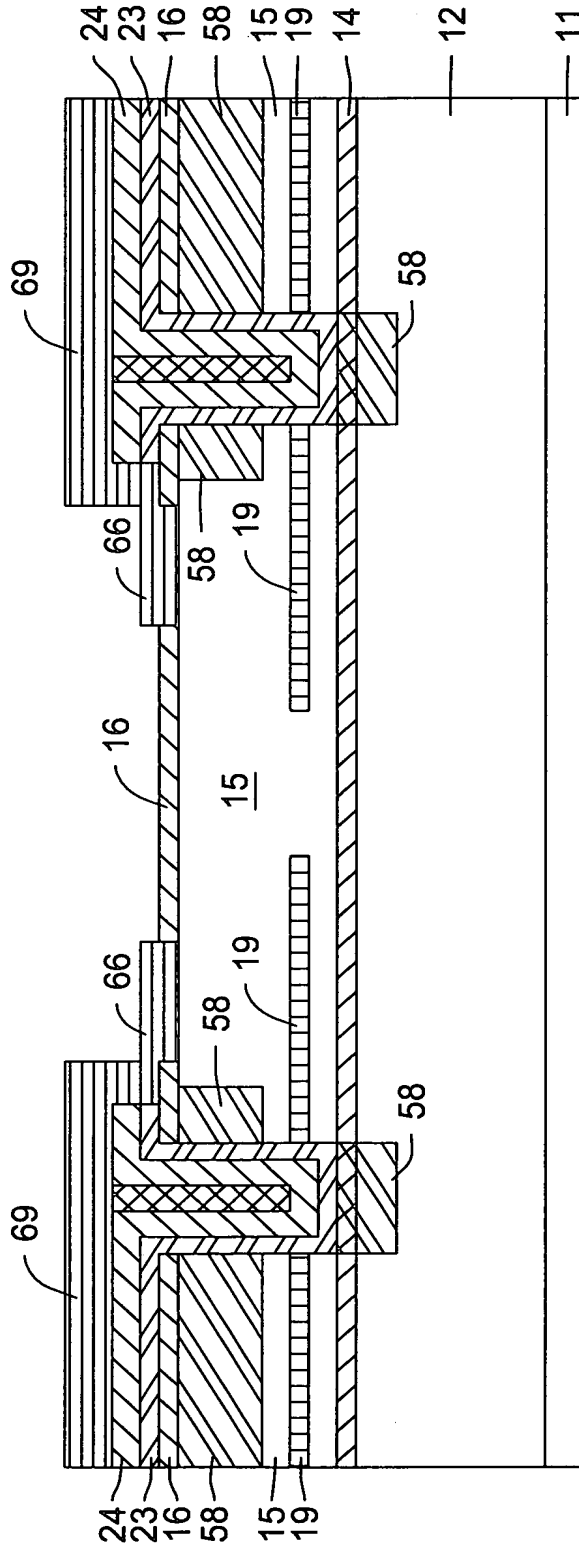


Figure 170

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100

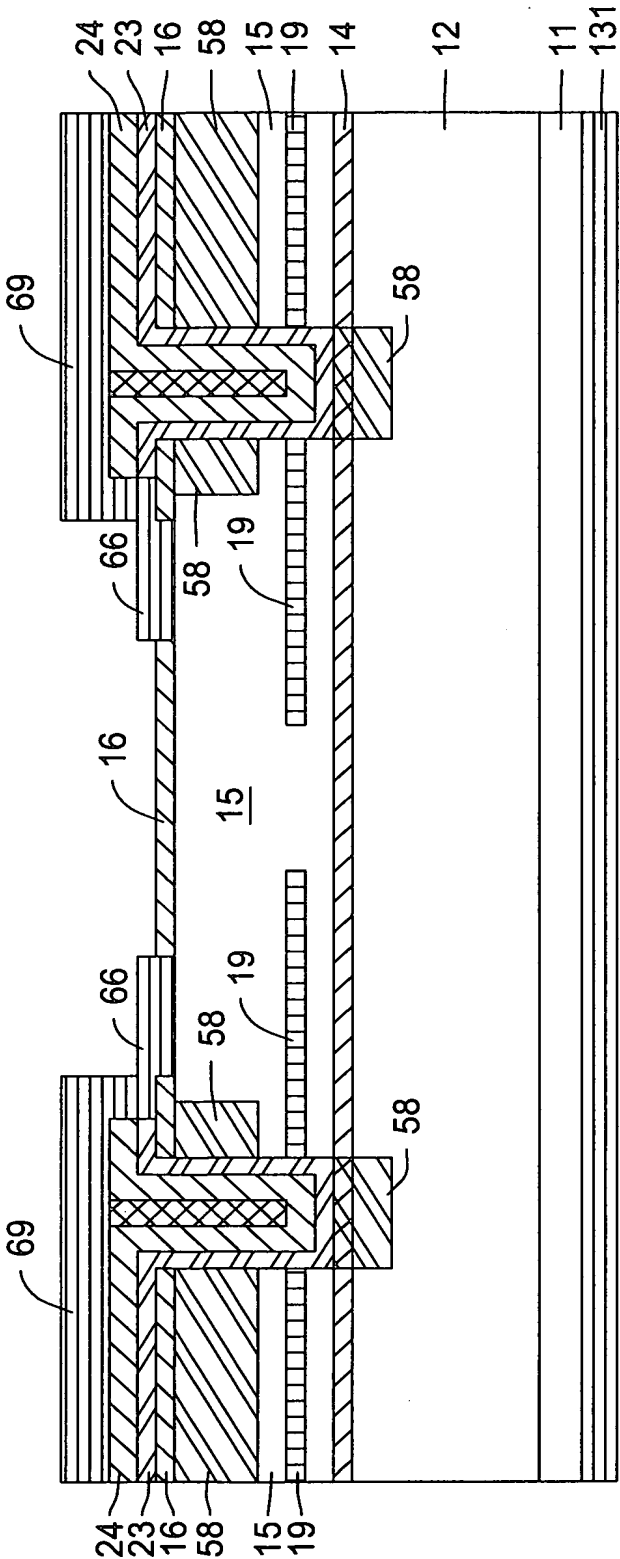


Figure 171

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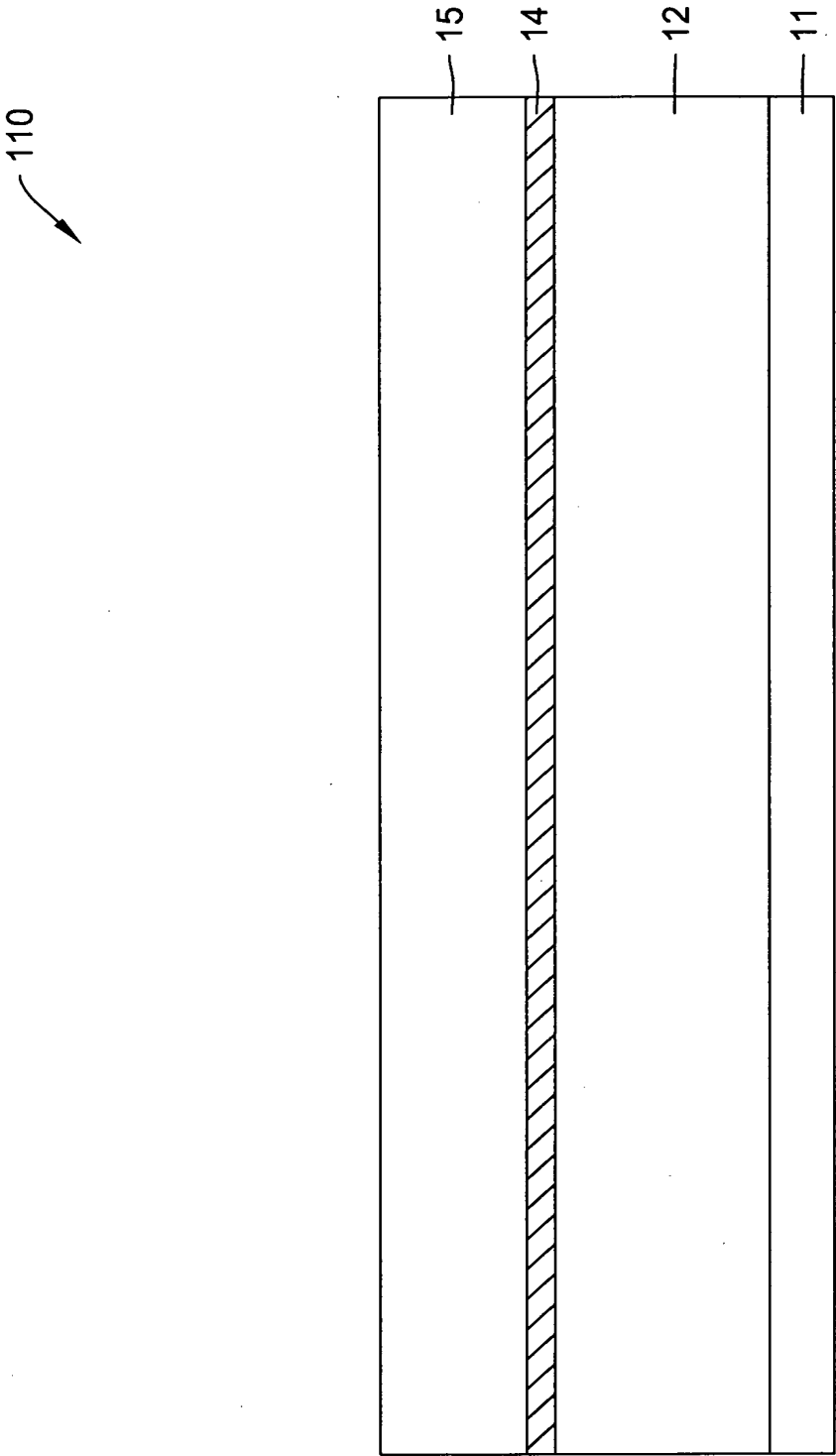


Figure 172

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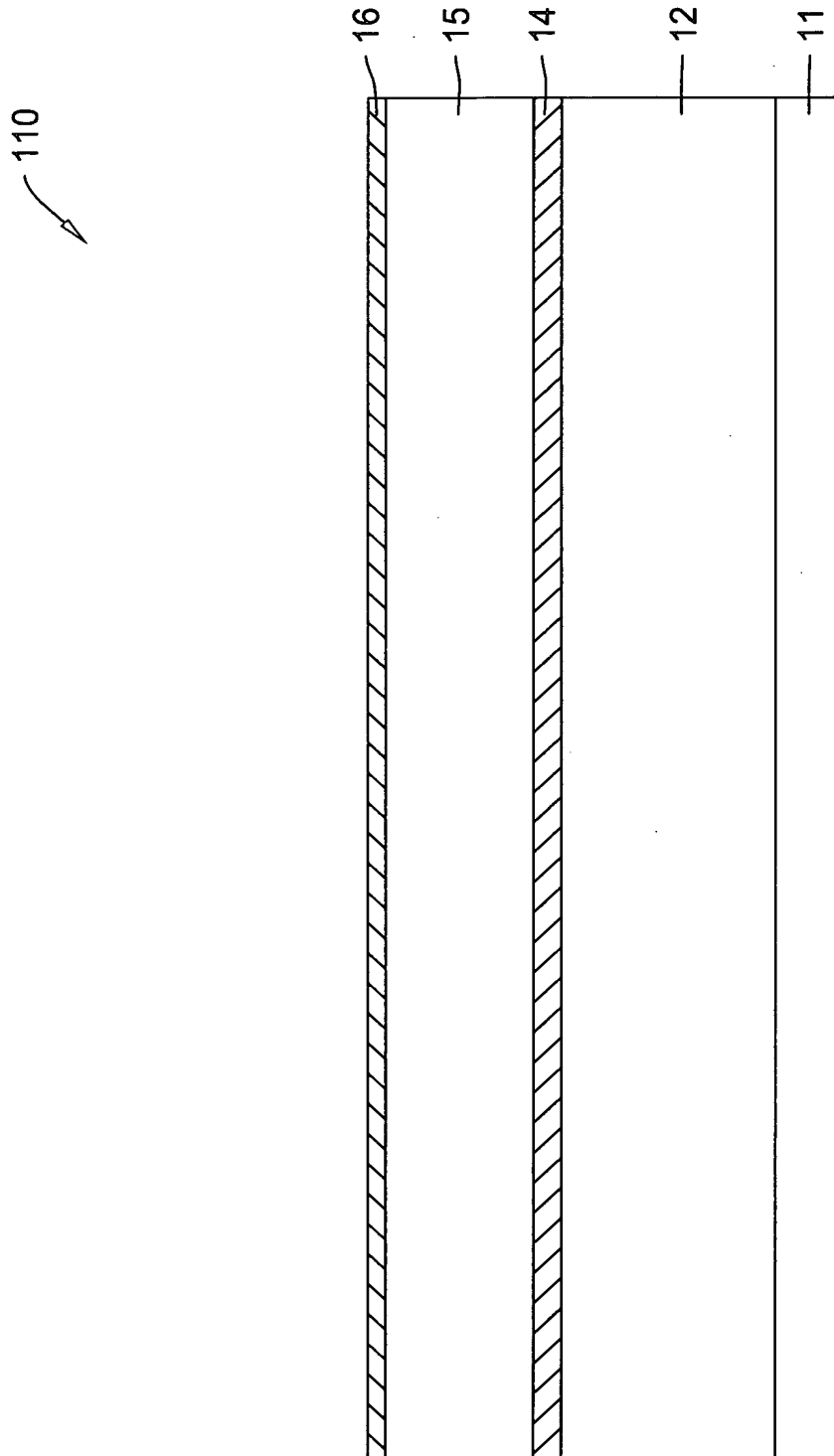


Figure 173

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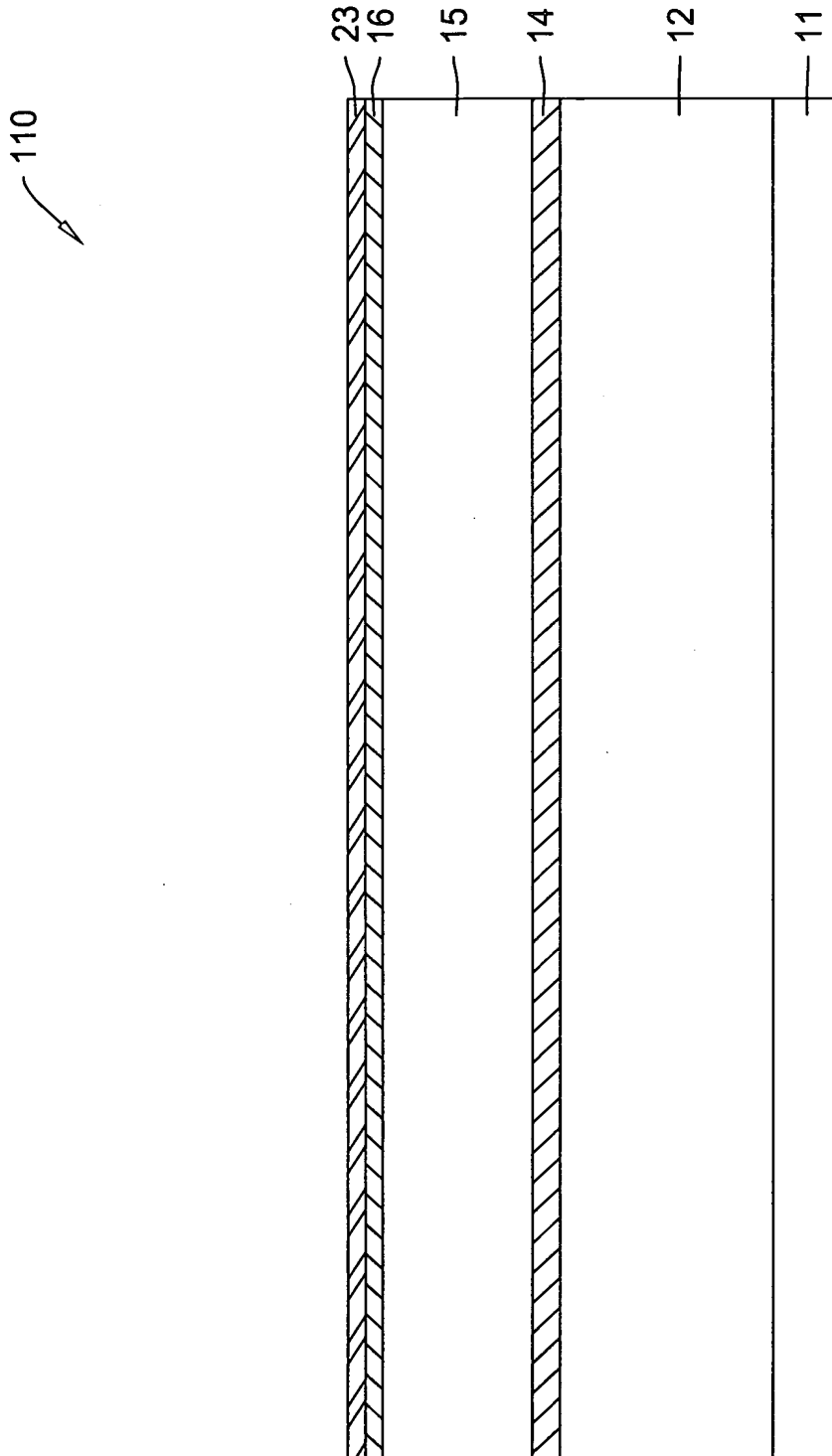


Figure 174

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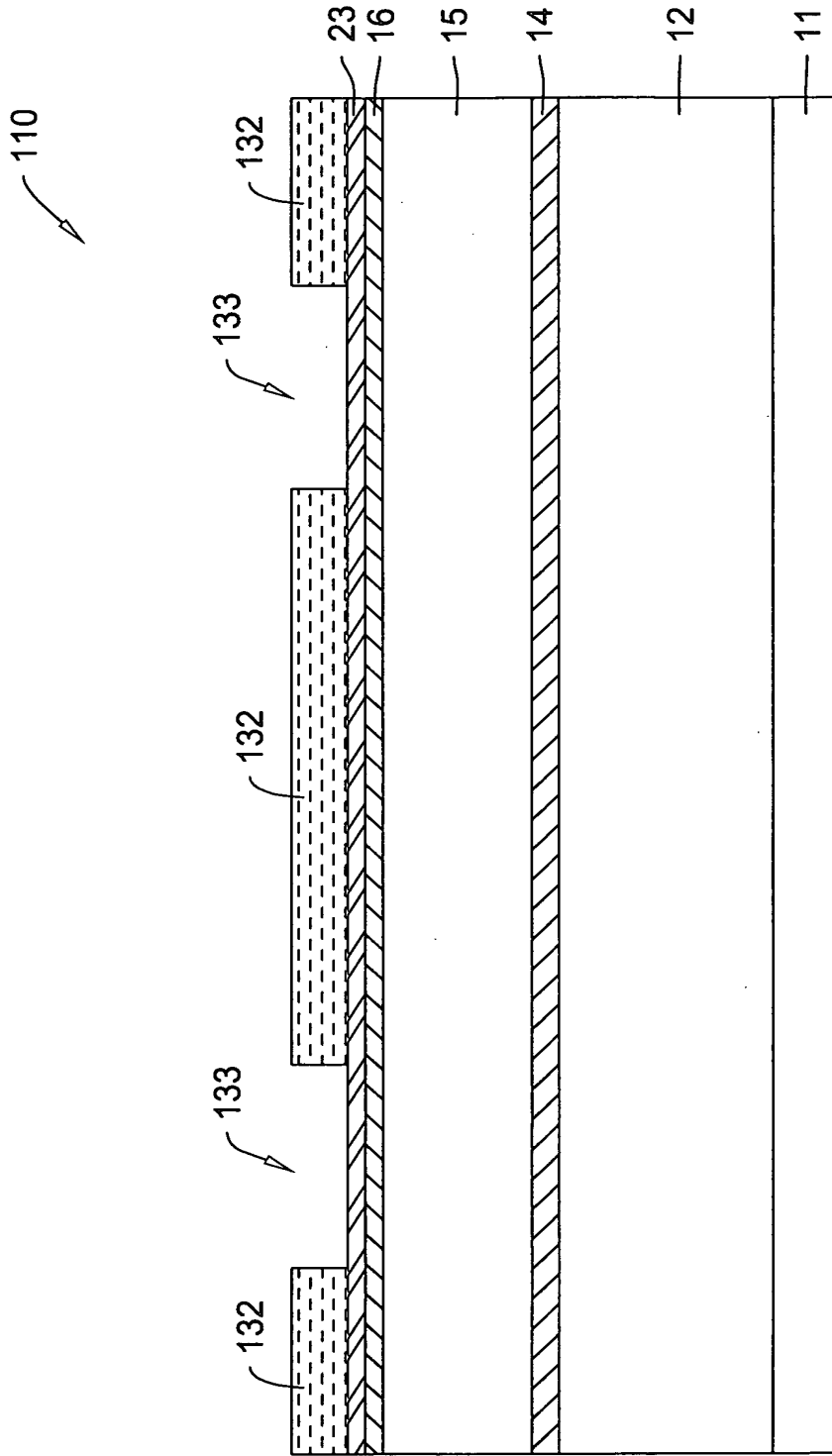


Figure 175

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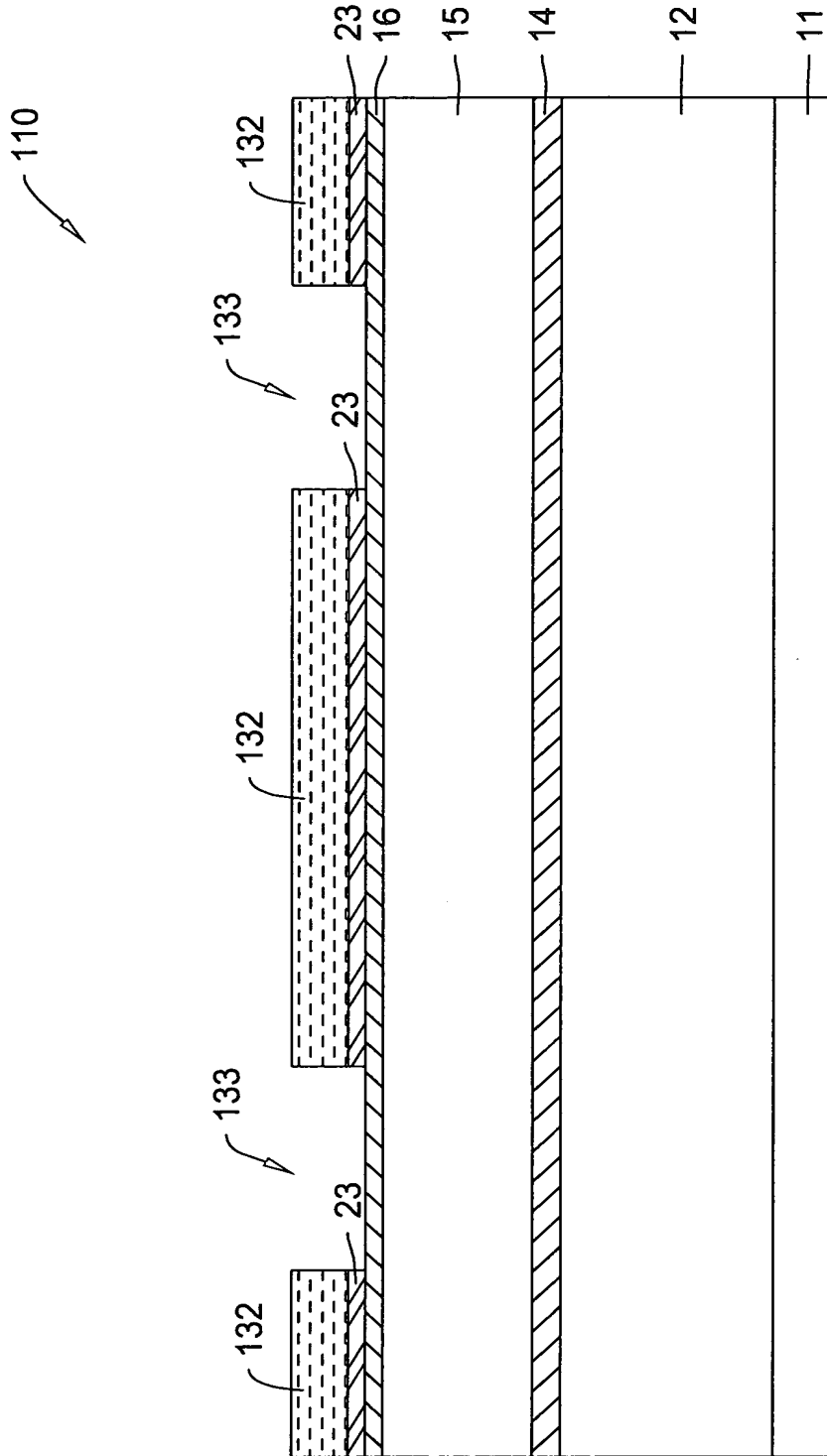


Figure 176

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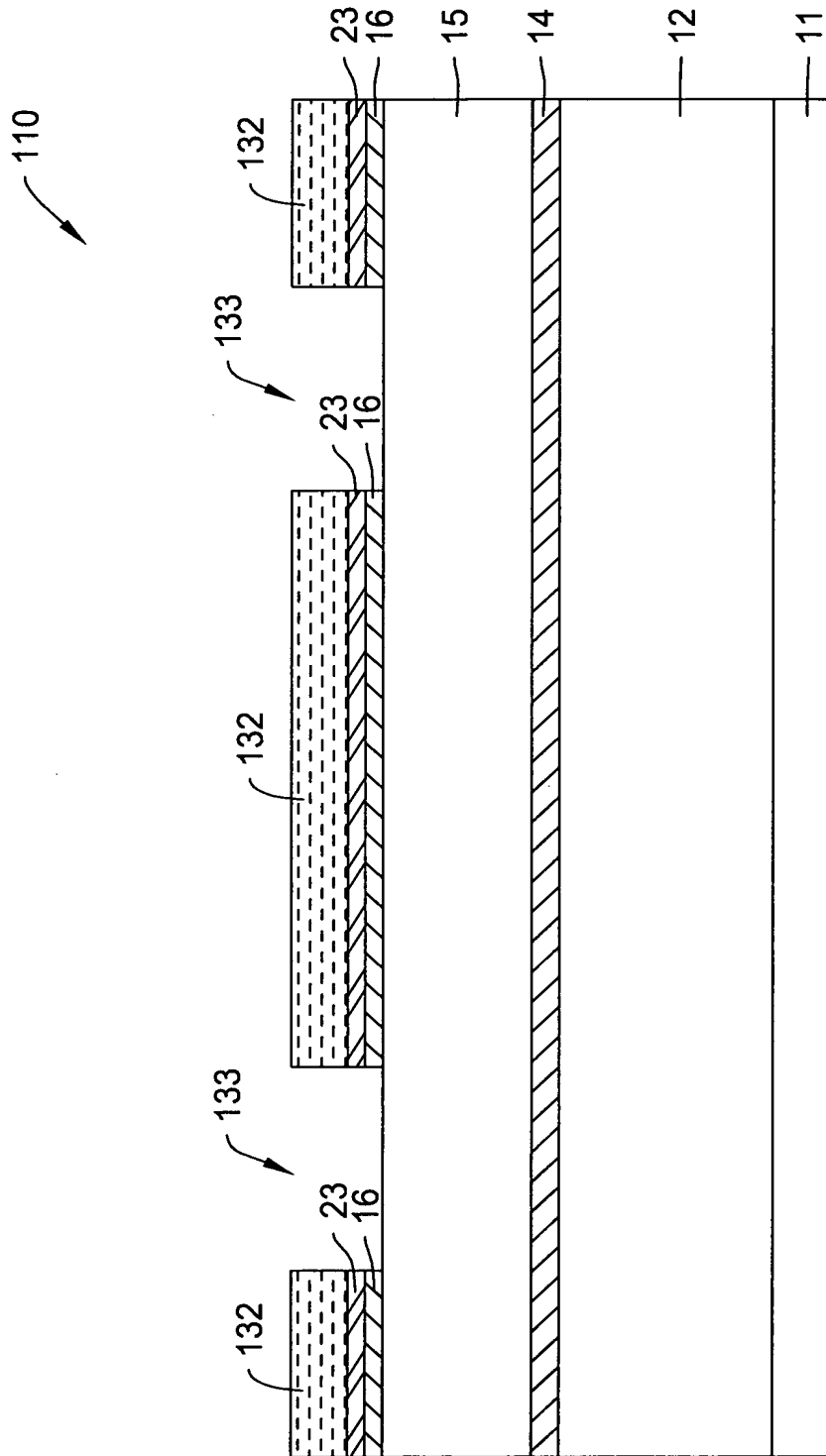


Figure 177

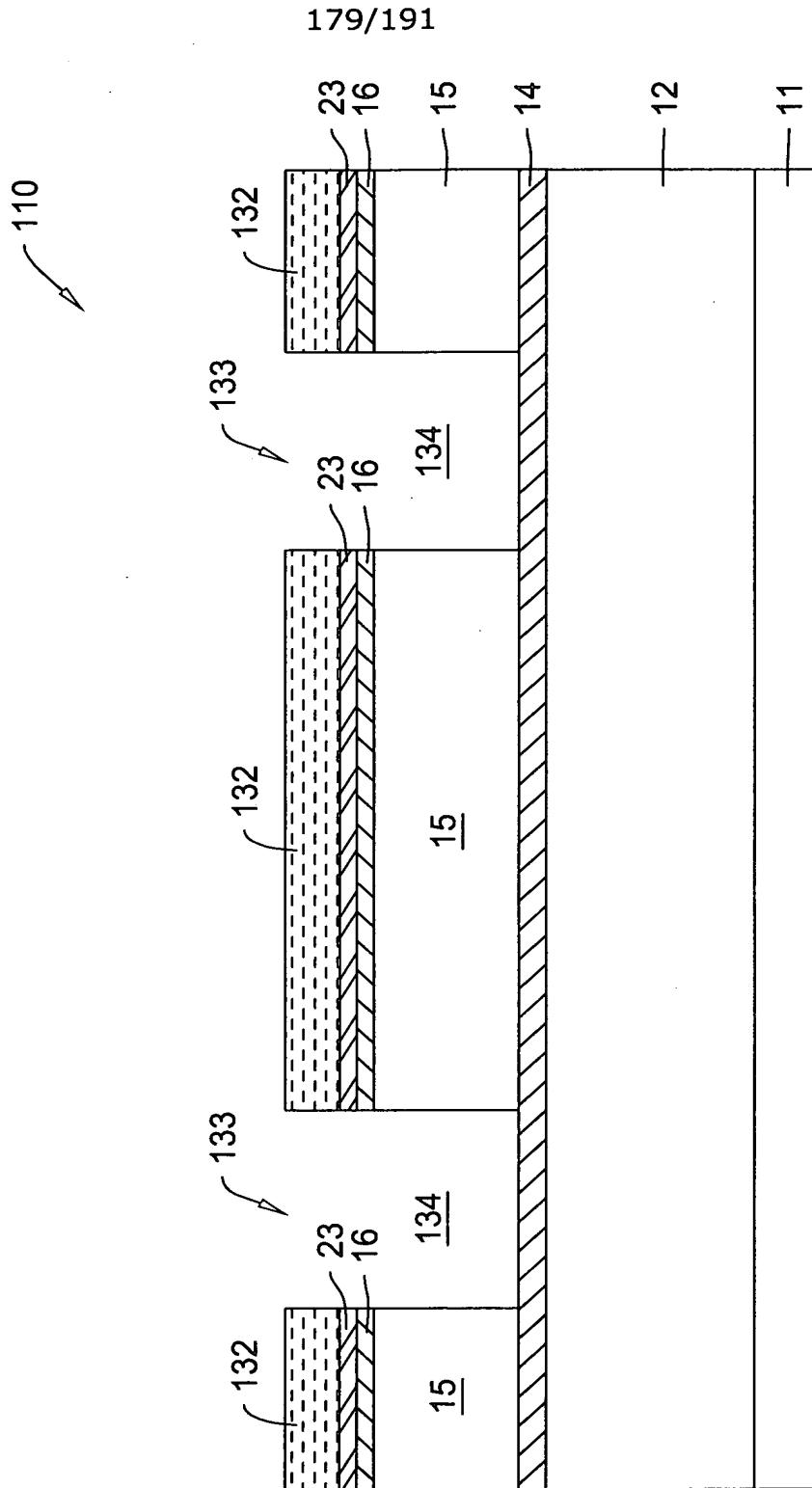
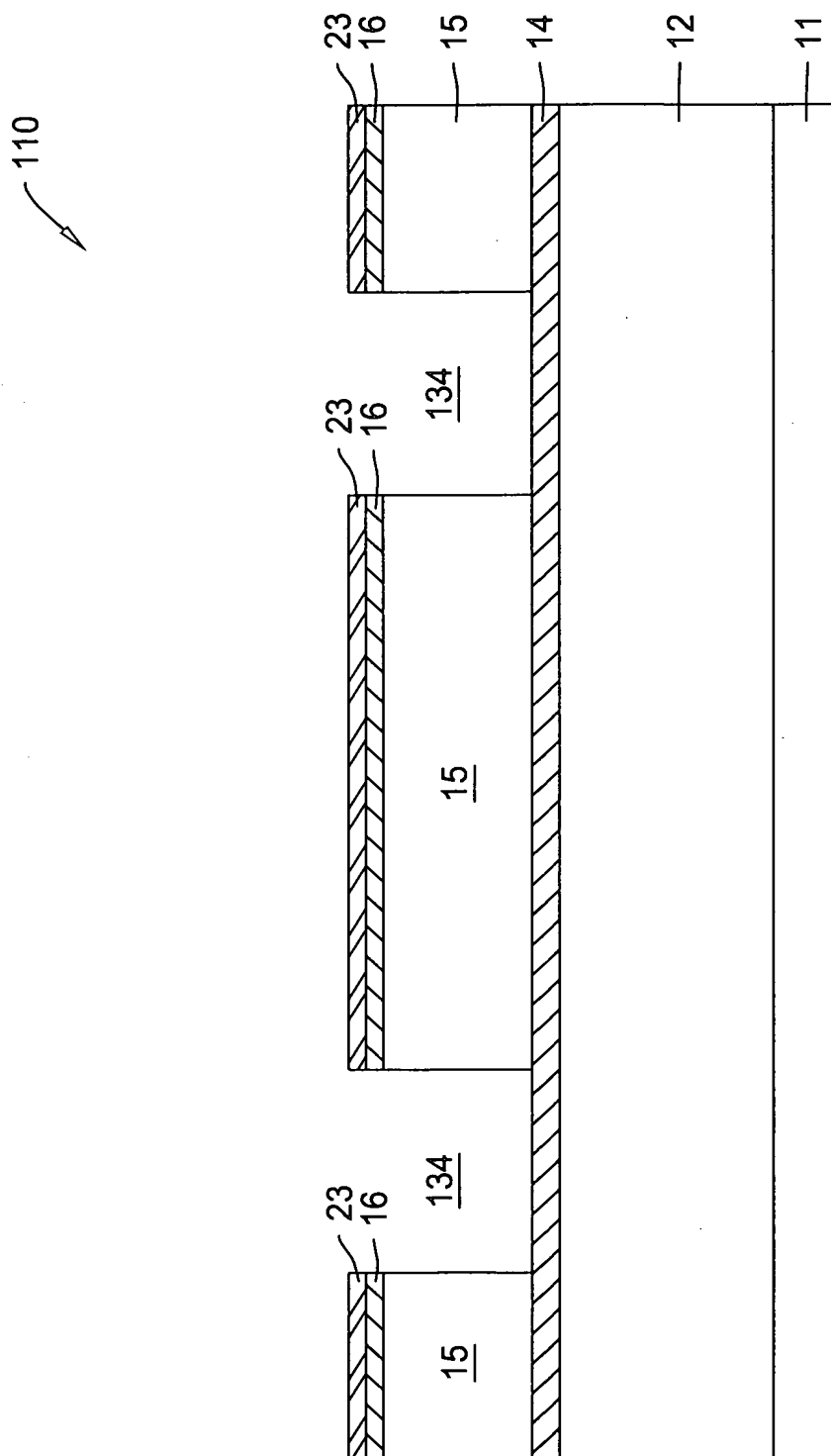


Figure 178



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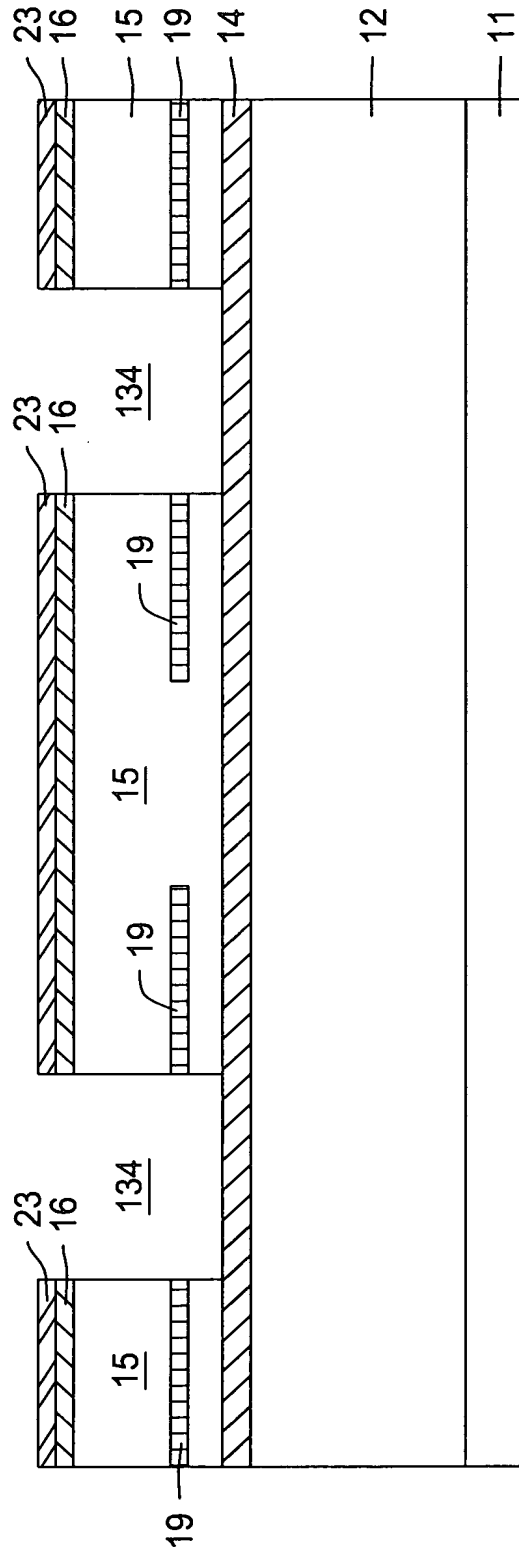


Figure 180

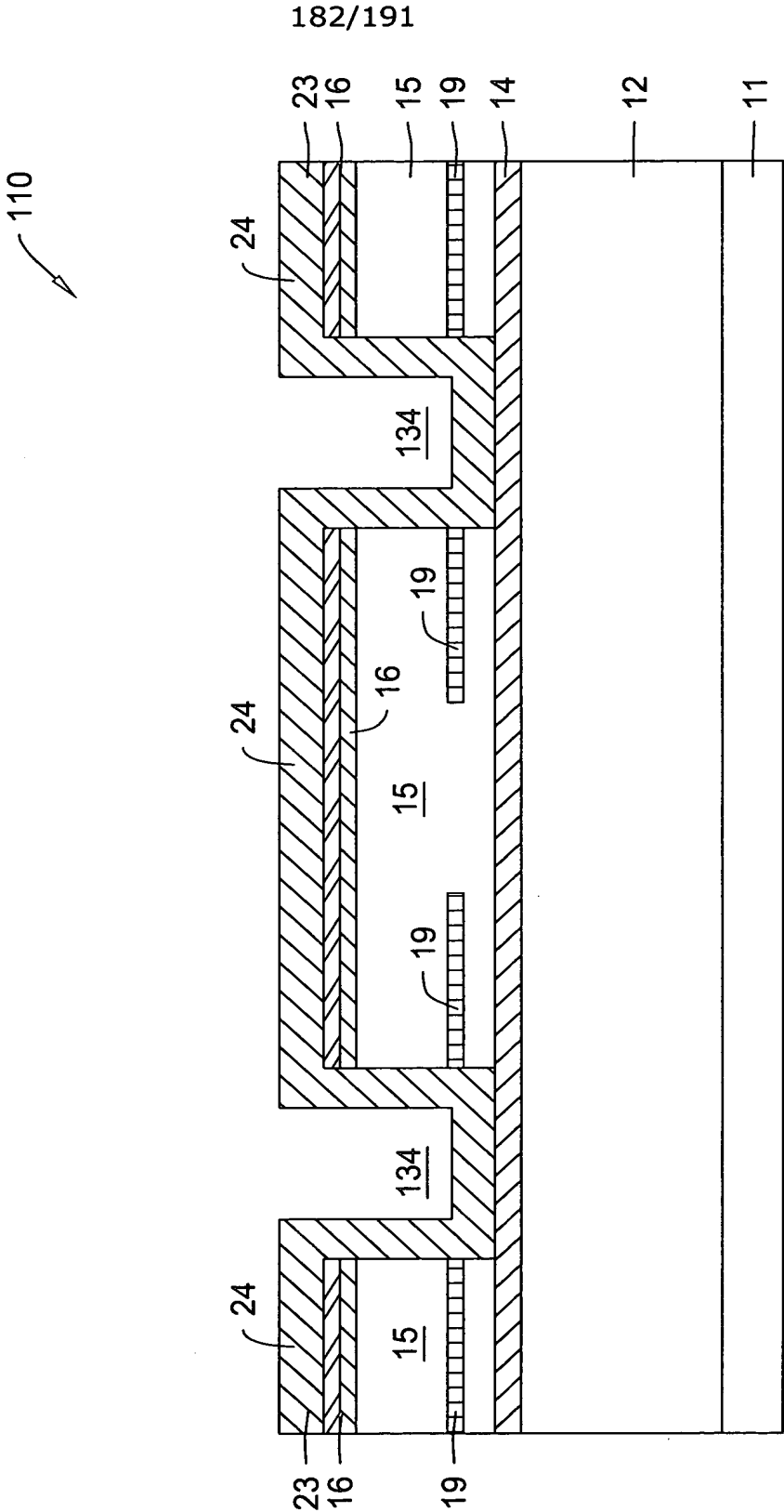


Figure 181

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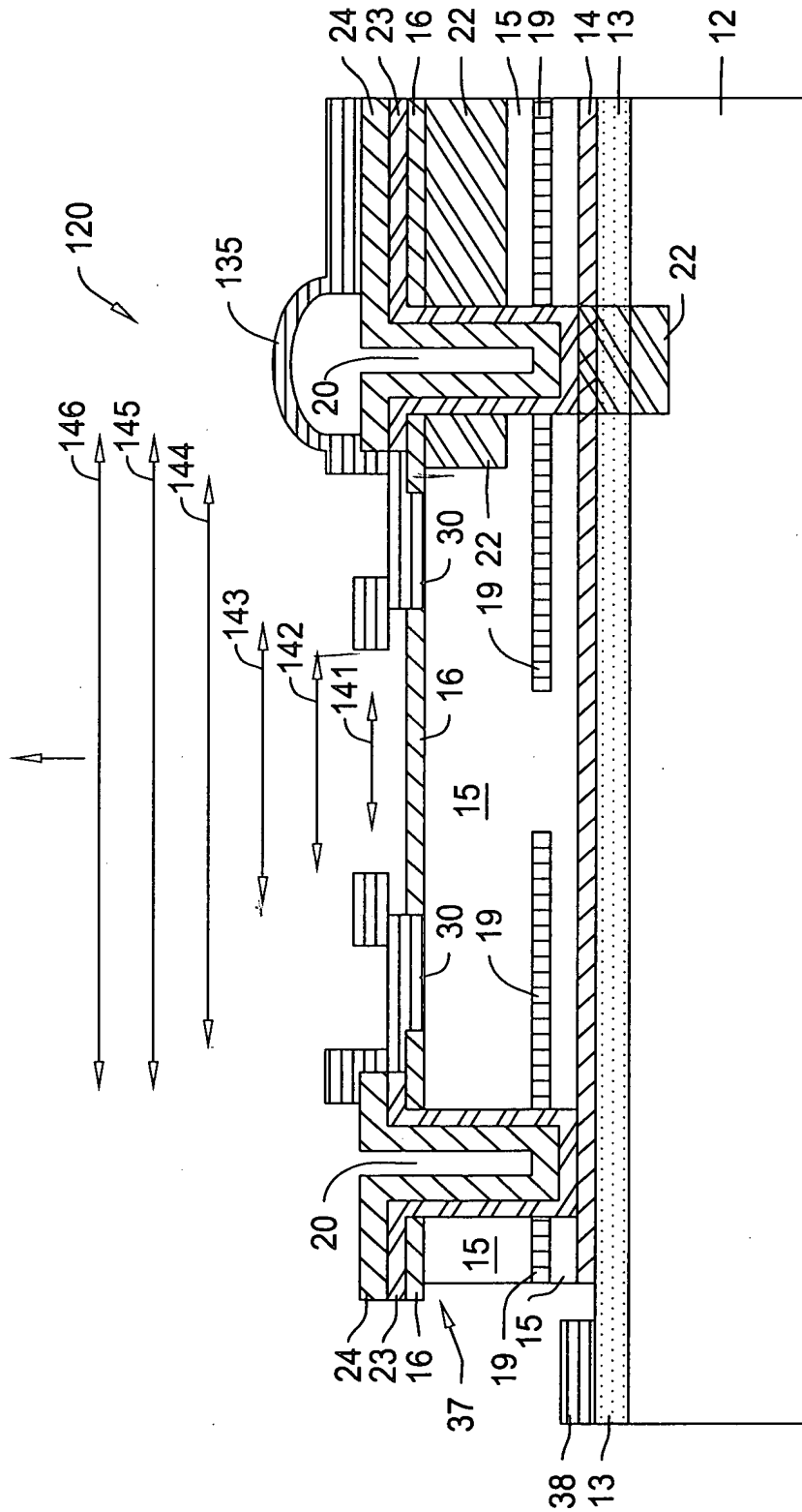


Figure 182

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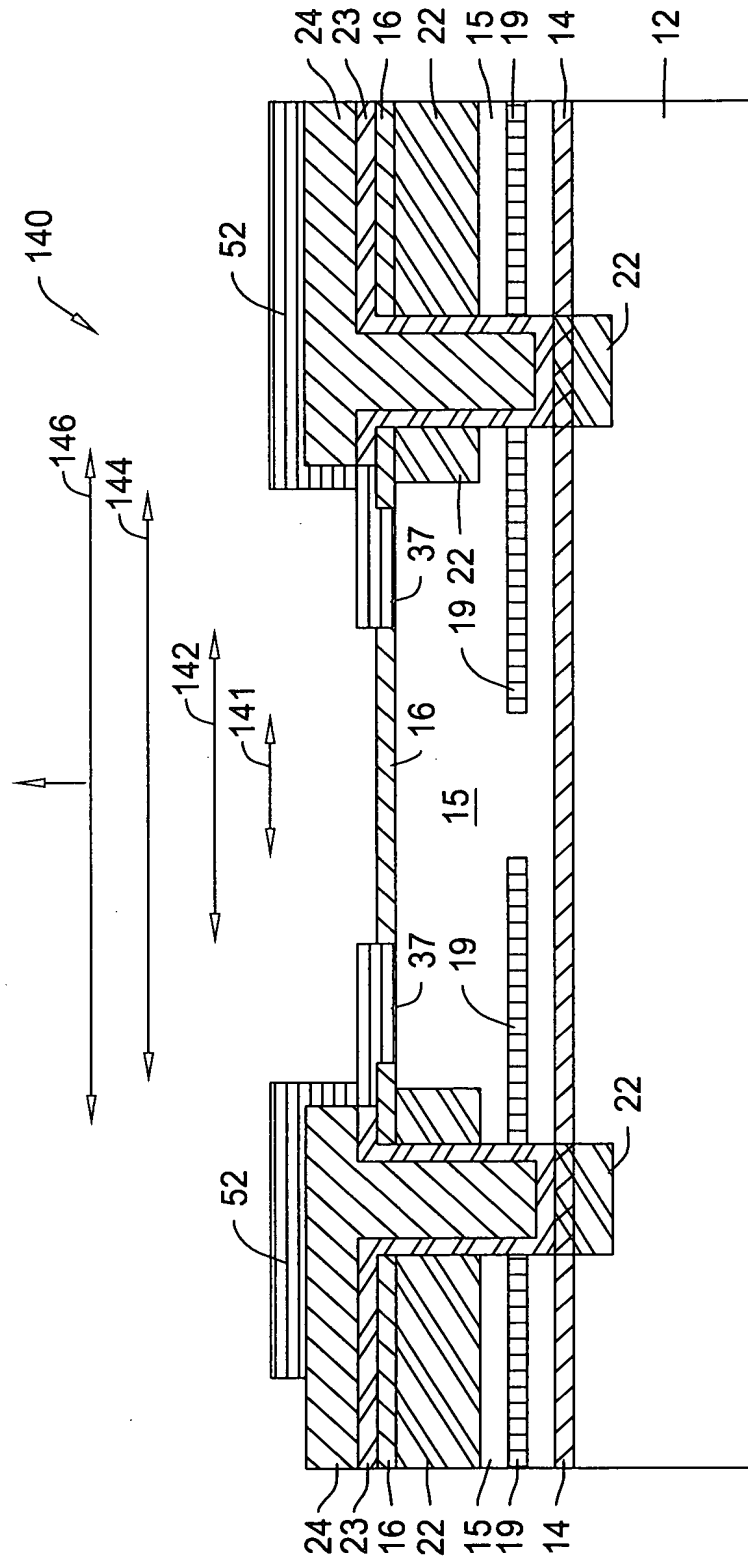


Figure 184

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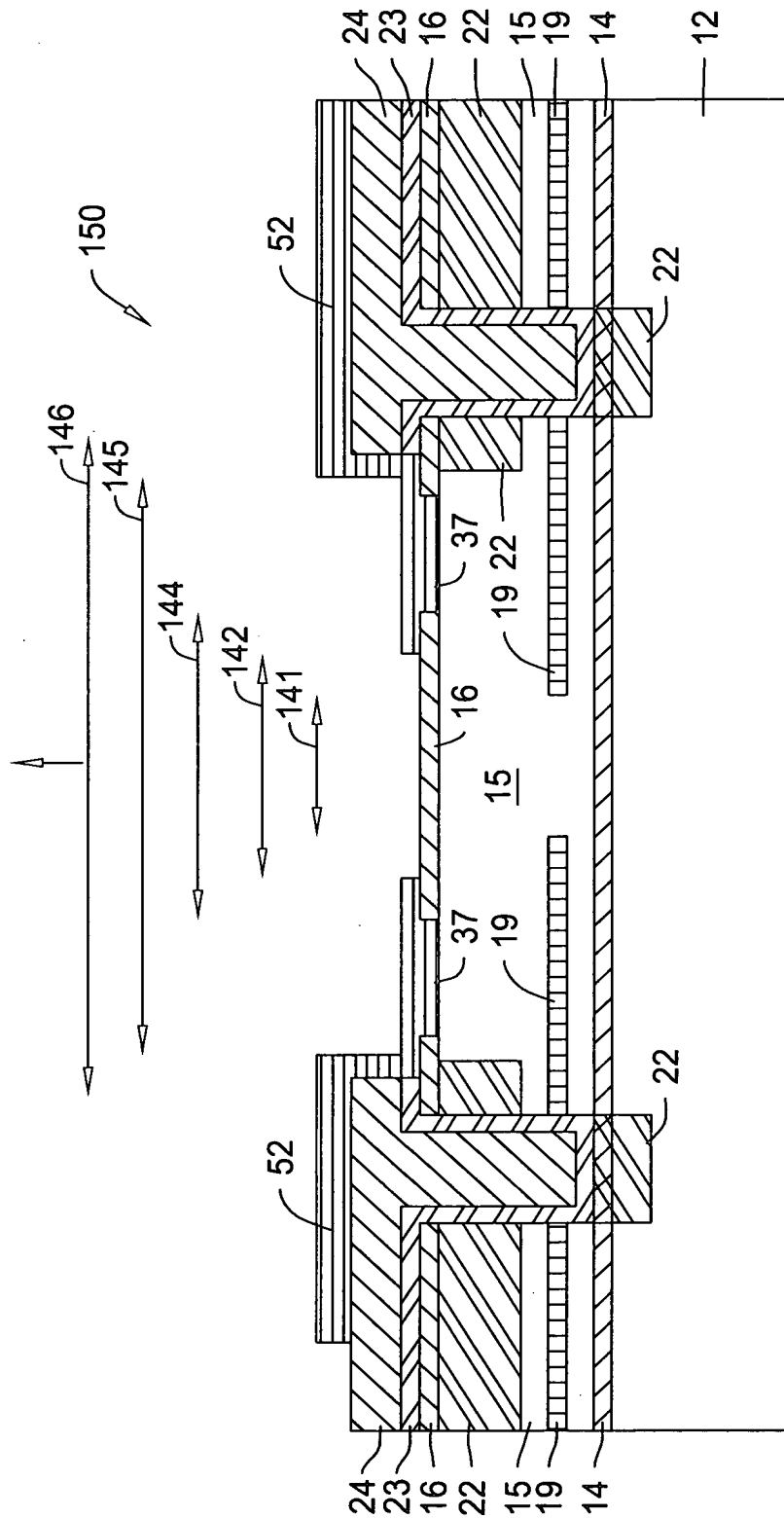


Figure 185

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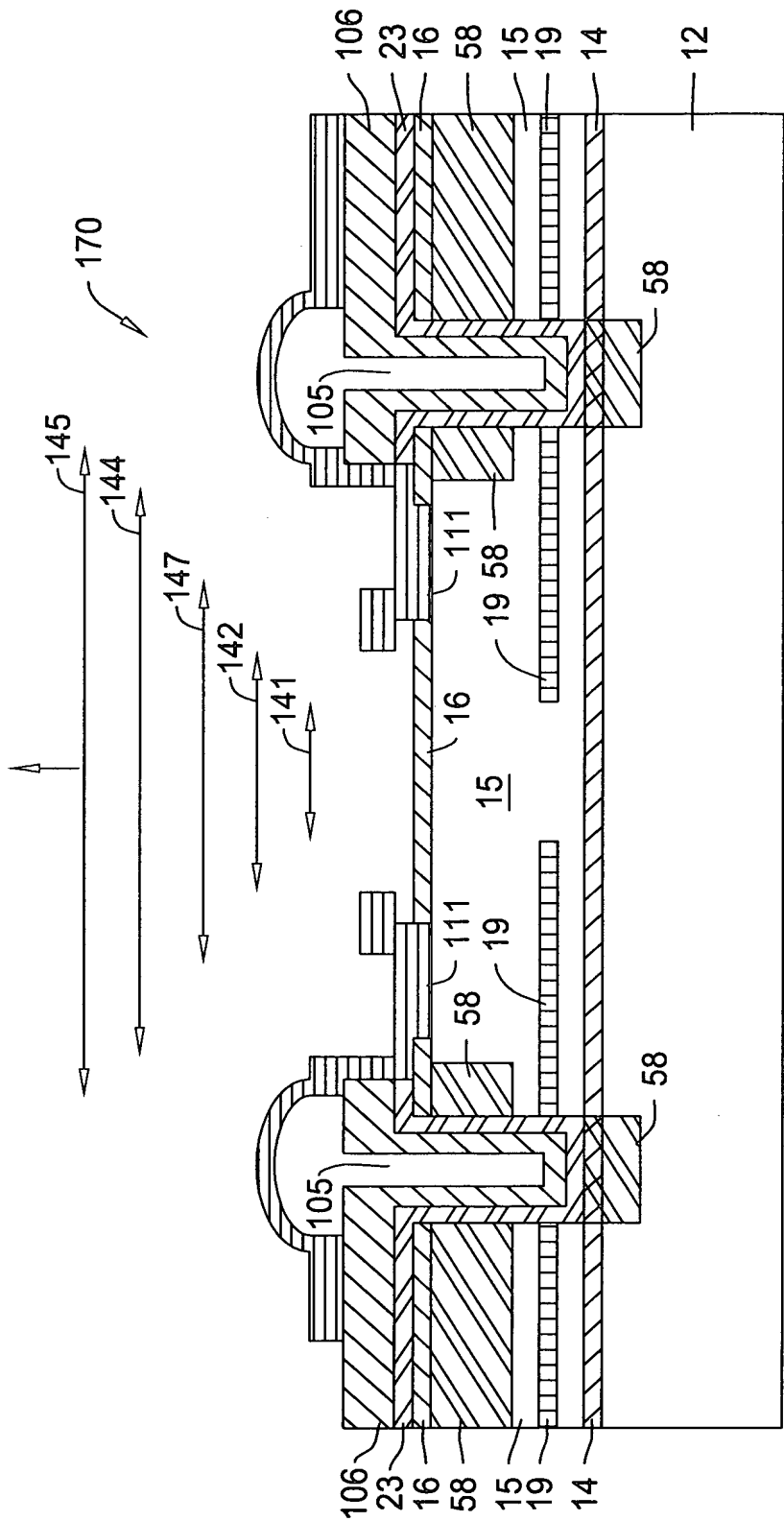


Figure 187

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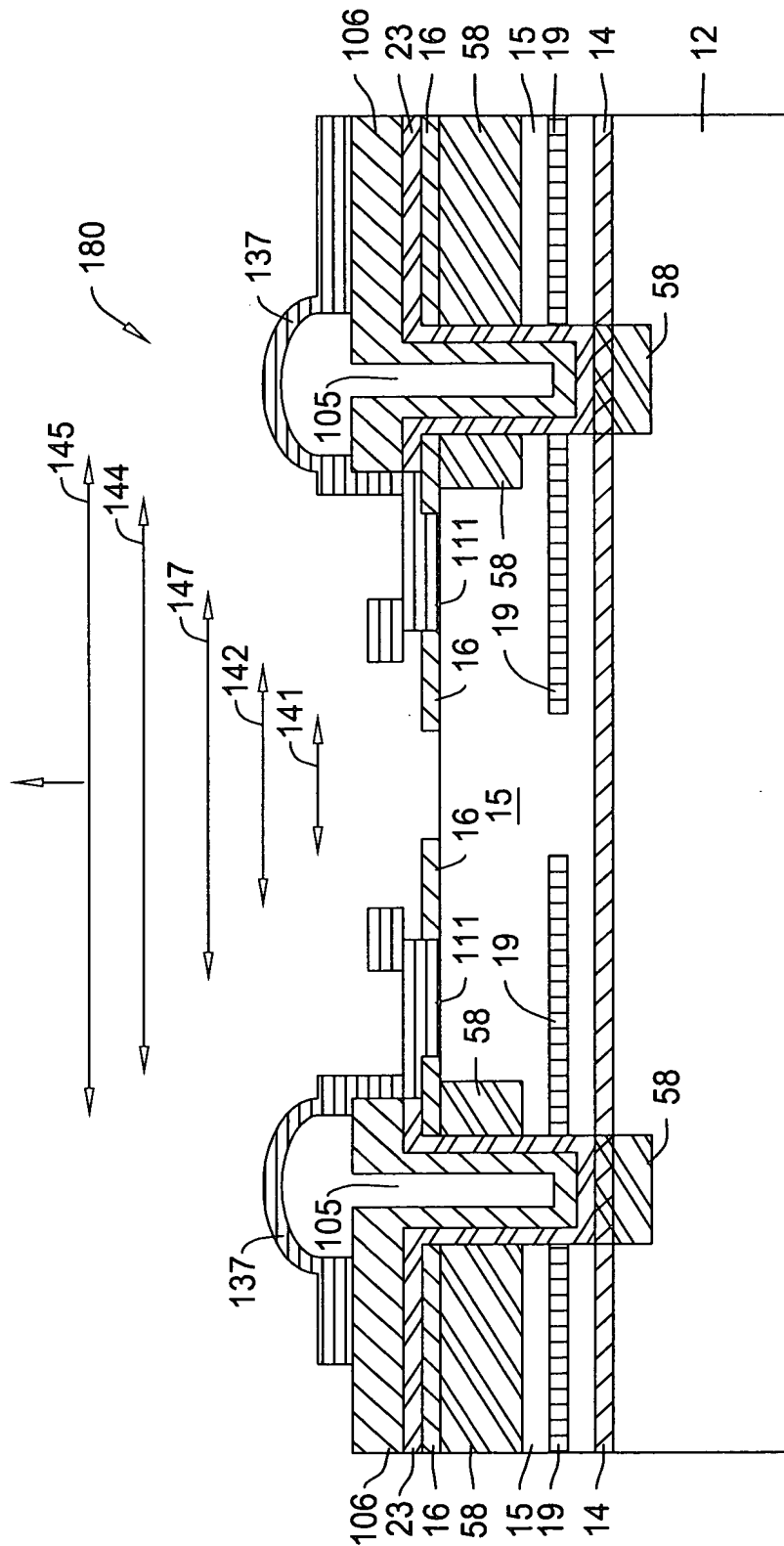


Figure 188

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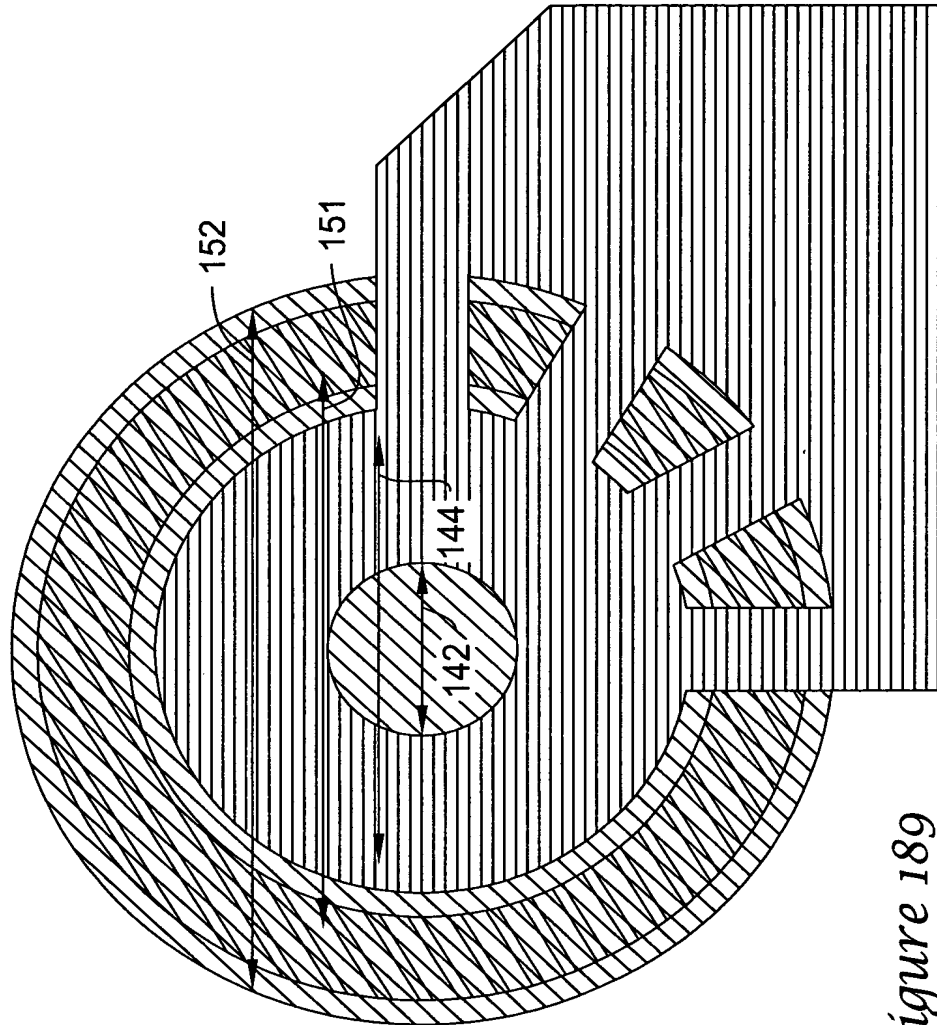


Figure 189

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Standard Layout Geometry

<u>Feature</u>	<u>Variable</u>	<u>Dimension</u>	<u>Notes</u>
Oxide Aperture	A	Variable	VCSEL Aperture
Oxide Trench ID	B	A+20	10 um lateral oxidation
Thin Trench OD	-	B+5	2.5 um wide trenches
Wide Trench OD	D	B+8	4 um wide trenches
Isolation	-	B-4	Implant isolation
Aperture Via	-	B-4	Area without thick coating
Inner Metal ID	C	A+M	Metal aperture pullback variation
Inner Metal OD	-	B-2	Partially covers trench
Contact Via ID	-	C+3	optional? Extends below metal ID
Contact Via OD	-	B-6	Slightly less than aperture via
Air Bridge ID	-	B-2	For patternable trench fill-ins
Air Bridge OD	-	B+12	Matched to wide trenches
AB Aperture D	-	C+4	Larger than metal ID
Outer Metal ID	-	B+10	Partially covers wide trench
Outer Metal OD	-	B+18	4 um wide outer metal ring
SA Coplanar ID	-	D+8	Largest diameter: 42 um
SA Coplanar OD	-	180	Set to near edge of die
HOM(Metal) Filter	F	Variable	Circle/polygonal pattern in aperture area
HOM(Etch) Filter	F	Variable	Circle/polygonal pattern in aperture area

Oxide Aperture Variations (A): 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 um
Metal Pullback (diameter) (M): 1, 3, 5 um
Higher Order Mode Filter (diameter) (F): .5, 1, 2 um

Figure 190